



Practical Taxidermy,

AND

HOME DECORATION;

TOGETHER WITH

GENERAL INFORMATION FOR SPORTSMEN.

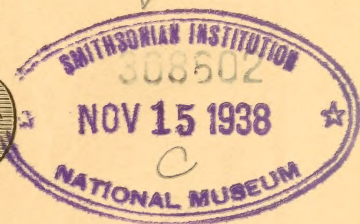
BY

JOSEPH H. BATTY,

TAXIDERMIST FOR THE HAYDEN EXPEDITION, AND OTHER GOVERNMENT SURVEYS
AND MANY OF THE LEADING COLLEGES AND MUSEUMS IN THE UNITED STATES.

AUTHOR OF "HOW TO HUNT AND TRAP," ETC., ETC.

125 ILLUSTRATIONS.



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PUBLISHERS' ANNOUNCEMENT.

JOSEPH H. BATTY, the author of this volume, has devoted sixteen years of active life to the work of collecting and preserving animals, birds, fishes, etc. He was the Official Taxidermist of the Northern Boundary Survey, and also of the United States Geological Survey, under Dr. Hayden—generally known as the Hayden Expedition. Mr. Batty has, likewise, been for many years Taxidermist for several of our leading Universities, Colleges, Museums, and Public Parks.

His work entitled, “How to Hunt and Trap,” published some eighteen months since, has received the warmest encomiums from recognized authorities, and from both the American and the European press. We anticipate a still more flattering reception for this volume, which is the result of long experience and practice, and conveys a vast amount of information on the subjects treated, not hitherto embodied in book form. There is no similar work in existence. While Coues and Maynard have devoted some space in their writings to Taxidermy, they have merely touched upon branches which are fully treated in this book.

The appreciation and love of “Home Decoration” increase with the growing taste and culture of the American people. Our author's chapters upon this subject are very timely, and will be keenly appreciated, especially by ladies.

PREFACE.

Good books on Taxidermy are not so common that I need hesitate to venture into print with a few directions of my own, written from practice and experience ; and in so doing I may remark that, with careful observance of instructions given, the student can make the art both a profitable and a delightful recreation.

The mere skinning and stuffing of a specimen is but a small portion of the Taxidermist's real work or pleasure. The hand must be turned to the making of cases, and the eye trained to the blending of colors. Taste must be cultivated and exhibited in modelling and molding, and Nature's beauties should be imitated as closely as possible. Artificial rocks can be made to look as natural as the moss-grown specimens in the woods, and trees can be formed as graceful as those in their native forests.

With the growing fondness for Taxidermy, many ladies are endeavoring to master the art, and in the variety of work necessary to perfect it, feminine taste and skill can be brought effectively into play. The collector can learn to mount his own specimens, the schoolboy his game, and in the general household, a buck's head in the dining-room, or a bright oriole in the parlor, presents a pleasing contrast to other ornaments.

J. H. B.



OUR AUTHOR IN COSTUME.

PRACTICAL TAXIDERMYY.

C H A P T E R I .

OUTFITTING.

Naturalists, as a rule, are hard workers, and in their enthusiasm often fail to make suitable preparations for an extended tour. In obtaining full collections, one can have but little choice of climate or surface, and as there is much to tax the strength, even under favorable circumstances, clothing, bedding, and food, should be most carefully looked after.

Heavy, soft under-clothing, and thick woollen overshirts are essential to comfort, and the buckskin shirt and breeches are far preferable to the skirted coat or woollen pants. A soldier's "caped" overcoat is desirable when hunting at night, and it provides a warm coverlet when bedding is scanty. Thick woollen mittens worn over woollen gloves make the warmest and lightest covering for the hands, though buckskin gloves can be worn in chopping, as the exercise produces circulation. In wearing mittens in hunting, the forefinger should have a stall, to facilitate the use of the trigger.

In a dry country, or at the north in winter, moccasins or larigans (shoe-packs) should be worn on the feet. Blanket footings wrapped over woollen socks, together with a little hay in the bottom of shoes, will prevent bruises, and in the severest weather protect the feet from frost.

In a rocky or damp country, heavy shoes or boots are required, and in mountainous regions those studded with iron nails. The Improved Patent Shoe for sportsmen's



PATENT HUNTING SHOE.

use is the best.* It holds the foot firmly by the self-adjusting straps over the instep and around the ankle, which is a very quick and convenient mode of fastening. This shoe is made of brown and black Bismarck grain leather, and is water-tight to the top.

For rough work, wet travelling, or when in the saddle, laced boots of English grain leather are decidedly the most serviceable and comfortable. The nails with which they are studded prevent slipping, and the strap at the top and laces over the instep keep the leg of the boot from dropping. The lacing also causes the boots to fit so snugly that the legs can not settle into large folds and chafe the ankle, and the heel does not slip and blister the skin. If by accident one gets in water over the tops, these boots can be easily loosened at the ankle and taken off, while the ordinary boot would be removed with great difficulty.

Leggings of canvas are light, and will do good service, particularly in wet grass, high weeds, and thick bushes. While being serviceable in protecting the limbs, they likewise give elasticity to the hunter's step, and do not annoyingly catch on twigs, as do breeches. One can with them noiselessly thread his way through the woods when still hunting, and they are of excellent service when moccasins or shoe-packs are worn.

* Any further information desired concerning this shoe, or other sportsman's accoutrements, guns, etc., alluded to in this volume, can be obtained by writing to the Publishers.

Long leggings are most comfortable for winter use. When wearing short ones, snow gets in at the tops, melts, and often chills the hunter when not exercising. Short leggings are desirable for summer and fall use, especially



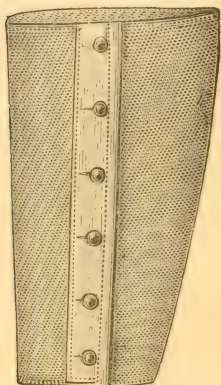
LACED HUNTING BOOTS.

on the plains. White ones worn in snow, and brown ones on bare ground, are least conspicuous.

Leggings are made with a variety of fastenings, being buckled, buttoned, laced, and tied. Laced leggings are least troublesome, and can always be kept tight, while other fastenings often become stretched and loose. Heavy leather leggings, as a rule, are hot, uncomfortable, and burdensome. If leg coverings of leather are preferred, it is best to wear high top-boots. Rubber apparel is bur-

densome, generally not conducive to health, and should be worn only for wading and fording, or on rainy days.

A light slouched hat should be worn in the summer sun, and a warm skull cap in the winter. Four long

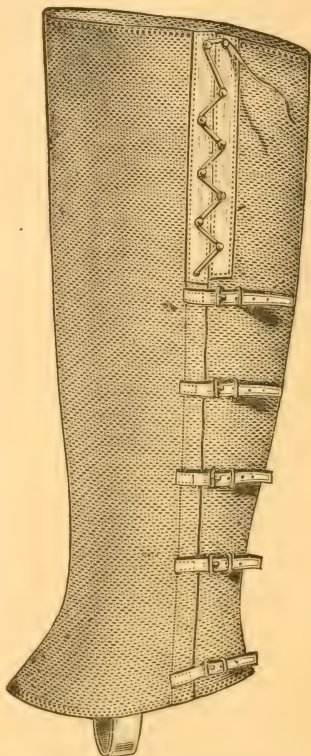


SHORT CANVAS LEGGING.

heavy California blankets should be taken for bedding, together with a small pillow and large poncho or a piece of canvas. The poncho should be laid under the bedding, in camp, and used for a wrapper in travelling. All the bedding should be rolled in a convenient pack, and bound together with three soft leather straps.

If of extra length, the latter will be found useful in hanging or packing game, making rafts, slinging guns, etc.

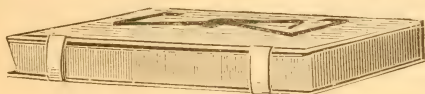
As large quantities of provisions as can be easily transported should be taken, and the variety should consist of flour, grits, rice, hominy, bacon, dried fruits, tea, coffee,



LONG CANVAS LEGGING.

sugar, condensed milk, baking powder, salt, pepper, and a keg of molasses or syrup. The traveller usually finds meat in the woods, and with rifle, shot-gun, and traps, can surely secure it.

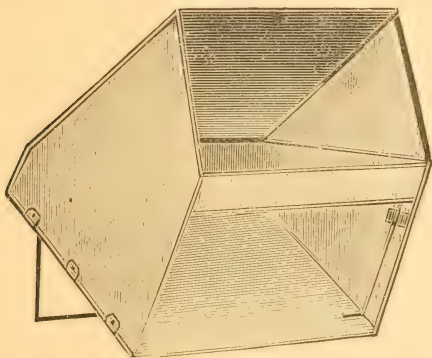
Sundries, such as sperm candles, needles, pins, thread, soap, tooth-brush, comb, and towels, are needed, and horse-hair and wire should be taken for snares. An axe, hatchet, and whetstone will be constantly used, and a



A CAMP BAKER, CLOSED.

water-proof match-box, or a flint and steel, is a necessity. One may meet with an accident, or find himself "under the weather," and as physicians are generally not to be had in camp life, court plaster, cathartic pills, quinine, and Dover's powders should always be kept about the person or in camp.

The cooking utensils should consist of a camp baker,



CAMP BAKER, OPEN.

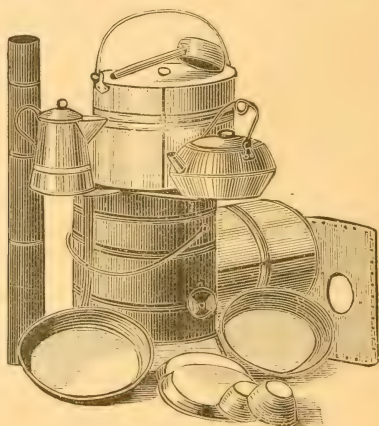
tin cups, plates, knives, forks, spoons, frying pan, and camp kettles, and two iron rods to make stands in the

fire. The folding camp baker is a convenient article for use. To do good service, it must be kept clean and bright. The new folding rubber pail will likewise be found useful, especially in cold weather.

The collector's kit for preparing and preserving specimens, is simple, and a small chest will compactly carry it. A set of instruments consists of a large and small scalpel or cartilage knife, crooked scissors, small tweezers, long and short forceps, brain spoon, needles and thread, and a pair of strong cutting-forceps to facilitate the removal



CAMP STOVE, PACKED.



CAMP STOVE, UNPACKED

of the contents of the crania. The necessary preservatives are: dry arsenic for birds, and saltpetre, salt, and alum, for mammals, though in warm weather, diluted carbolic acid is quick in action and should be used to prevent decomposition. Ordinarily, a mixture of two parts alum and one part salt, is all that is necessary for mammals. Other materials are, plaster for drying the plumage of soiled birds, corn-meal to facilitate skinning, cotton, tow, excelsior, sea-grass, or moss, for stuffing, and sheet-cotton to split and use for wrappers. A light, flat-topped trunk,

containing thin wooden trays, will hold the outfit and many small specimens. For special trips where transportation is available, a light chest, bound with thin iron, is preferable.

When camping for a season, a camp-stove is really necessary, and affords great comfort. One can be secured with full variety of utensils, weighing but 25 lbs., and costing but a moderate sum.

Guns, ammunition, and traps, should be selected according to the game to be sought for. A suitable selection of shot should also be made, though the collector needs, usually, Nos. 4, 8, 10, and 12.

For ordinary trapping, the 0, 1, and 2 traps are used ; but in a country where large animals abound, larger traps will be needed. A full set of collector's instruments is very essential to the naturalist's outfit, also materials and preservatives for preparing specimens, which will be treated of hereafter. Articles liable to be lost by the bursting of wrappers, should be placed in small canvas bags, all of which should be enclosed in a larger one ; they can thus be easily packed and handled. A few bottles of strychnine will be found useful in poisoning animals.



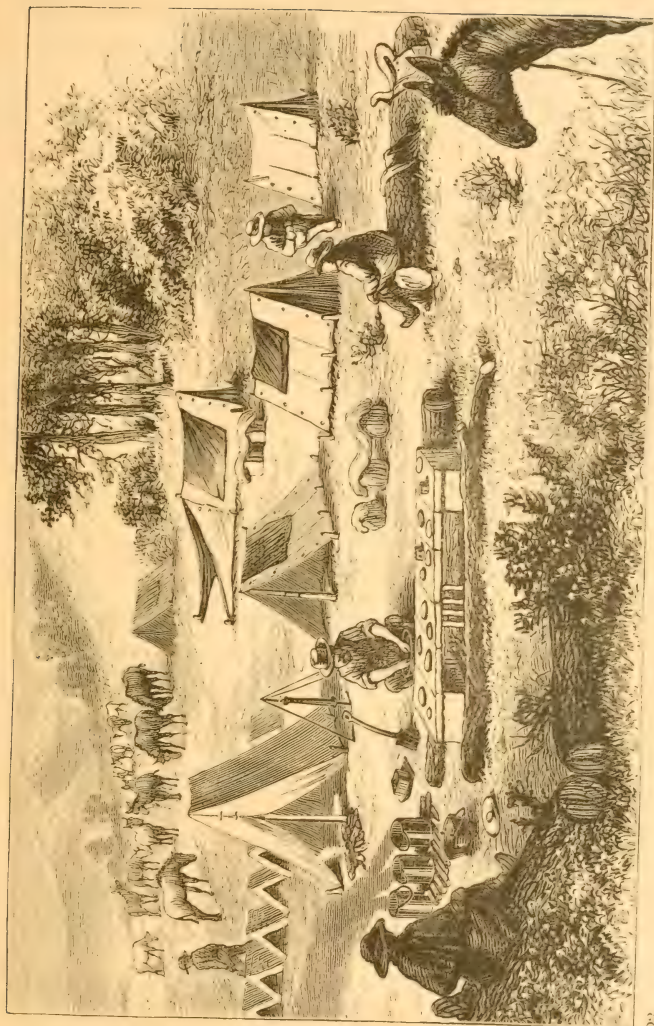
CHAPTER II.

CAMPING.

The comfort which the veteran camper takes in his abode in the woods, strongly contrasts with the inconveniences experienced by the amateur.

The former quietly "turns out" at daylight, knowing just where to put his hand on a few dry twigs or a little birch bark with which to start the fire, and in a few minutes the coffee-pot boils, and venison steaks or fish are broiling over the fire. But little wood is employed, yet the fire is compact and cooks quickly and "to a turn." In the meantime, bedding has been rolled up, rifle cleaned, cartridges and traps selected, and route laid out. As the last mouthful of breakfast disappears, the hunter puts on his belt, reaches for his rifle, and then starts off sanguine of a good day's sport.

The amateur "turns out" late when the flies will allow him to sleep no longer, and goes limping down to the brook for a pail of water. He then calls for assistance to make a fire, which, when made, is large enough to roast an ox, and so hot that he cannot approach it. He stands around hungry and impatient until he has a bed of coals, then makes preparations to cook. He finds himself compelled to splice a pole to the frying-pan, as the fire is still too hot to approach, and he often places the coffee-kettle on a stick that burns through and dumps the contents on the fire. While looking about with consternation, the meat burns, and one misfortune after another follows. By the time breakfast is over, the sun is high in the heavens, the deer have sought their beds, the fish have ceased to bite, and the best of the day is gone. On a cold rainy morning, his troubles increase, but if difficulties are encountered with patience and perseverance, city "rust"



A CAMP IN THE SIERRA MADRE MOUNTAINS.

wears off, and he learns to feel at home in the woods, and becomes as jolly as his comrades.

An A tent without a stove is large enough for four men, and can be used until snow flies. If a camp-stove is used, it will occupy one side of the tent, and then there will only be room for two to sleep comfortably. In winter, a tent should be staked down firmly to the ground under the south side of a hill, but not so tightly that the first rainy night the canvas will contract and draw the pins. When this occurs, the tent falls, the stove is overturned, knocking down guns and making general disorder.



A CAMP SCENE IN FLORIDA.

der. A knoll in a tamarack swamp makes a good warm site for a camp, as it is well protected on every side.

The iron pins from the upright poles should go through the ridge-pole and canvas about two inches, and guy ropes be fastened with a clove or double hitch at both ends. When tent-poles are stiffened in this manner, guns can be slung from the top of the tent, and pins put in the standard poles, on which clothing can be hung.

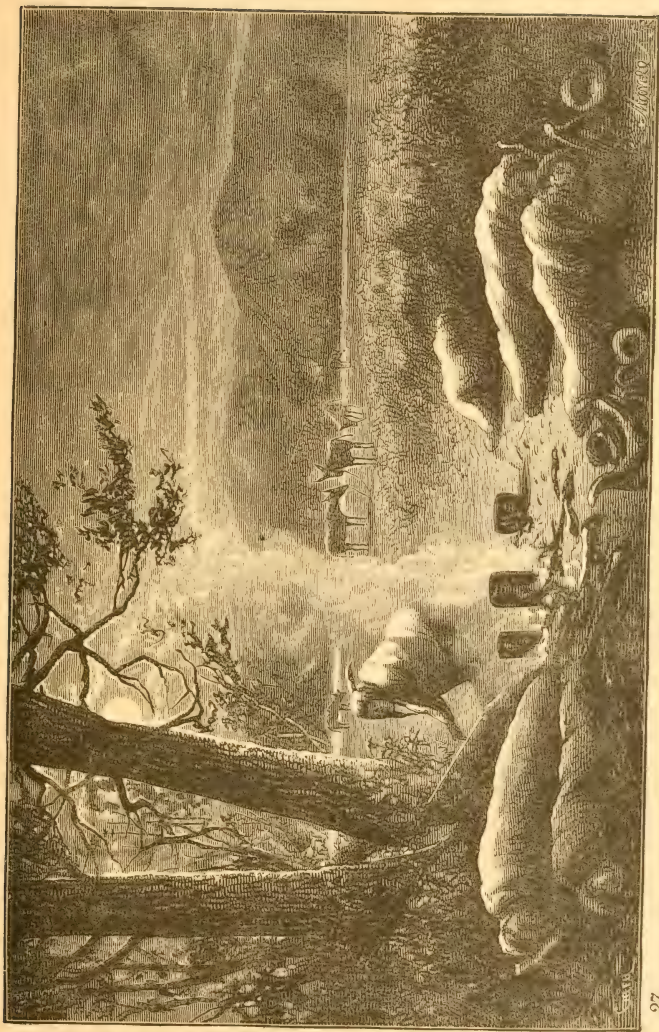
The stove should be set up on clay, or earth and stones,

in an inclosure made of four small logs, half jointed and pegged together at their ends. This will prevent bedding from being burned, and facilitate cooking. The tent should be ditched until snow comes, when it will freeze in for the winter. The bottom of the tent should be covered with straw if obtainable, or rushes, oak leaves, or spruce boughs. Hemlock branches will do for a few nights, but they soon lose their leaves and elasticity.

When sleeping in the open air with scant bedding, keep your head under the blankets, and the warmth of your breath will be almost equal to that of another blanket. If one acquires the habit of sleeping face downward, he will, according to my experience, rest warmer than when lying on the side or back, and is less liable to take cold. Most of the bedding should be on the ground under the sleeper, to keep the dampness from the body. Never sleep in your clothing in a cabin or in the open air in mild weather, when there is plenty of bedding, as you rest warmer and more comfortably without it.

When "roughing it," lie with the head to the wind, fold the blankets under the feet, and wrap them as closely to the body as possible. With two blankets and a buffalo robe, the hunter can sleep warm enough in a snow-drift, with the thermometer below zero. If convenient, fell white pine, spruce, or tamarack trees on the north side of the tent, to break the wind and prevent the snow from drifting about it.

When a cabin is constructed, and a fire place used, much wood is consumed, and a large clearing will be made by spring. It will require nearly a cord of wood every twenty-four hours to heat a cabin in the north woods, and in the latter part of winter logs often have to be carried from a distance through deep snow and over tangled limbs. For these reasons the cabin should be built where wood is abundant, and, if possible, in a grove of white birches. They make the best of fire-wood when



AN OLD COLORADO CAMP.

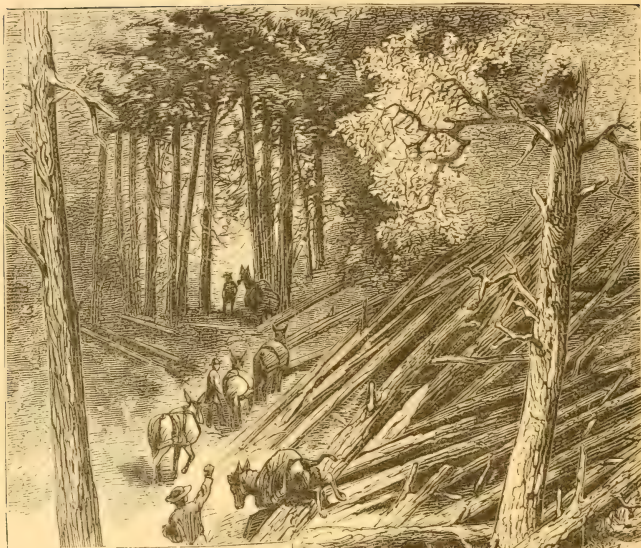
green, and when frosted, a single stroke of the axe will lay a large log open. Wood can be economized by using maple sticks for side logs of the fire, as they burn slowly, one pair lasting all night. They should be cut long, and moved up as the ends burn away.

Water is one of the greatest necessities in camp, and in a cold country, springs and small streams are not always to be depended upon in winter. A camp should be located near a large body of water, where it can be obtained by cutting through the ice. A volume of instructions might be written about camping, but I have only given points learned by stern experience, which, if made use of, will prevent much hardship. Forethought and self-reliance are the "best holds" of the camper, and experience the best teacher.



CHAPTER III.

TRAVELLING.



TRAVELLING IN THE ROCKY
MOUNTAINS.

The hunter should ascertain as much as possible about the country he intends hunting, and travel over it according to its features.

To hunt in the Rocky Mountains, medium-sized, sharp shod mules should be used, and apparahoos for pack animals. Pack saddles rock about and bruise the animals' backs when



heavily loaded. The bruises turn into sores, and useless animals is the result.

Wagons should be employed on the plains, as the transportation they afford will admit of many useful articles being taken along that could not be packed on the backs of mules.

For coasting, a small cat-boat with cabin, and table leaves (sunken in the sides of the trunk) is convenient in making "short runs," though a sloop-yacht, with jib and top-sail, is better for rough weather and winter work. The former is readily managed, and will run close to the wind, though a rough sea shakes the wind out of her sail, and breaks her headway, when a sloop-yacht would plow through a heavy sea.

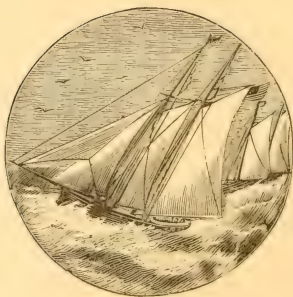
For traversing lakes and ascending rivers, the birch canoe and Bond's patent section boat are the best. There is no easier mode of travel than the well trimmed canoe affords. The "capacity" of a birch canoe is great; the average sized one carries two men and outfits. A long, well built canoe should be used in open waters. Those made by the Passamaquoddy and Mick Mack Indians are the best, though the Chippewas construct good ones. I have sailed in a stiff breeze with a Passamaquoddy canoe ten miles from land with two men and four large seals. A canoe is only fit to sail before the wind.

Rafts are easily and quickly made, and often serve the voyager well; dead cottonwood and white pine logs make the most buoyant ones. A small raft will carry a heavy load, and is rapidly "poled" over shallow water with hard bottom. It can be paddled over large lakes and across tranquil rivers on a still day. Rafts are the most useful in descending rivers, and should be made and trimmed with care when shooting rapids.

It will often pay the hunter, when there are no paths leading to his hunting-ground, to strike the head of a river where roads abound, and raft his outfit down to a

desired location. Circumstances have been such that I have found it necessary to cook on a raft having three men, their outfits, and a dog. Of course all this was inconvenient, but one is glad of any make-shift in an emergency.

When going a long distance to a seaport, send all freight by a sailing-vessel, as it is the cheapest transportation. Outfits should be forwarded in advance of a party so they will have ample time to reach their destination before wanted.



CHAPTER IV.

TRAPPING.

Nothing is called more effectively into use in a game country than a good set of traps. The various birds of prey and animals taken by them far out-number those brought down by shot-gun or rifle, and the specimens are in much better condition for mounting than when perforated with shot.

Many nocturnal animals can be trapped when it would be almost impossible to shoot them, as they rarely venture in open places during the day. The wolf, fox, lynx, wild-cat, raccoon, skunk, opossum, mink, and weasel, are of this class.

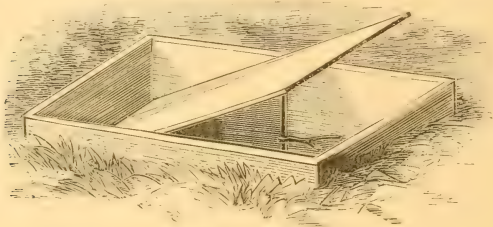
A naturalist or hunter should carry a few small steel traps in his belt, and set them whenever he may come upon fresh "sign." The movements of animals can never be anticipated, and often in the delay of returning to camp for traps, they will have changed their quarters. A successful trapper sets his traps with the earliest "suggestions" of game, provides a good stock of bait, regularly visits them, and keeps them free from snow.

The best time to take animals is after a light snow, when, from the tiny shrew to the "antlered buck," all appear to be on the move.

Animals have depot camps to which they resort at irregular intervals during their peregrinations. When one gains a thorough knowledge of the country, the runways of animals can be marked and traps kept permanently set for miscellaneous game.

In winter, protected places should be chosen under the banks of lakes and rivers where the snow will not blow. High winds generally come from one quarter in winter, and traps rarely need shifting.

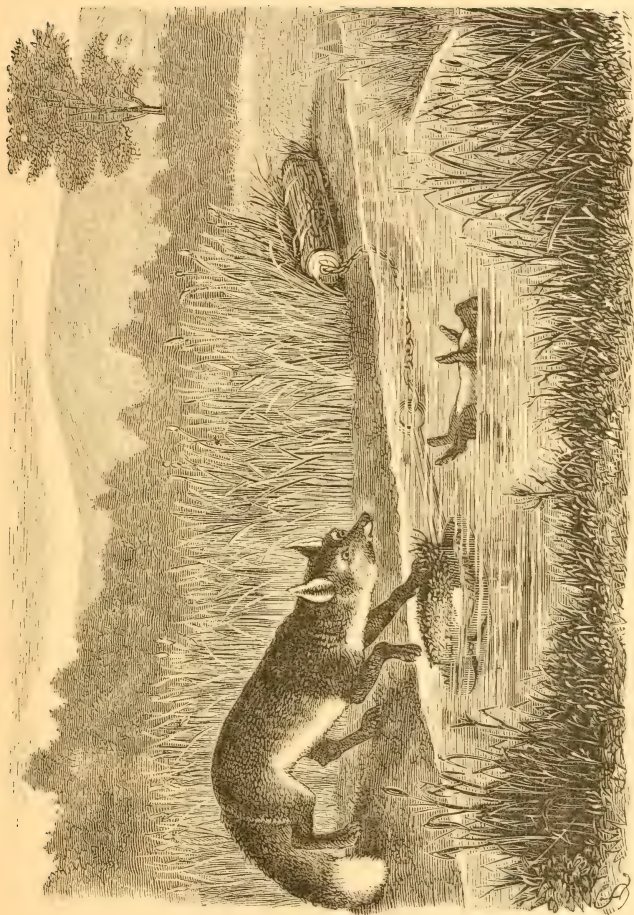
When putting out a line of traps, have the trail cover as little ground as possible, and let them set so that in visiting, tamarack swamps, rush beds, thickets, and sloughs, need not be crossed. Snow falls early when the swamps are but half frozen over, and if the hunter is not cautious, he often breaks through the thin crust of ice under the snow. He is made most uncomfortable, and sometimes, if the weather is cold, a frosted foot is the result. When visiting traps, a straight even trail made in the beginning, saves many steps later in the season. Often when traps are set and trails well broken, fresh



GROUND TRAP.

sign will be seen more remote from camp. In breaking new trails to the localities, care should be taken to make old trails of service and camp at all times as accessible as possible. By taking in full the features of a country, and making trails in accordance with peculiarities, much inconvenient travel can be avoided.

In capturing birds, many species can be taken with various traps which are too numerous to illustrate. The ground trap is one of the simplest and best, and, if properly constructed, will be successful in taking many species of small birds, particularly the thrushes and others which feed on the ground. It is usually made with a box about fifteen inches long, ten inches wide, and seven inches deep, and should be placed in the ground, as seen in the above engraving. A square piece of board,



TRAPPING A FOX.



sheet-iron, or zinc, is used for a lid. One end of it should rest in the bottom of the box at the extreme end, and the other end must rest on the top of the opposite end of the box. A small peg, two and one half inches high, with an even end, is driven into a hole in the bottom of the trap. On this peg rests the flattened end of a short-forked spindle, held in position by the weight of the lid which rests on a small wooden pin. The bait is thrown into the bottom of the trap, which is sprung by the weight of the bird as it alights on the spindle. This trap can be hastily made with four bricks buried in or set on the surface of the ground. With it I have trapped many Blue Jays late in the fall and winter, and it is the only trap I have known these cunning birds to enter.

The ordinary trap-cage is successful, but the usual "market"-cage is not properly made. A trap-cage should be long, with the apartment for the call-bird in the middle, raised in a semi-oval form between the trap-doors, so that the decoy bird is plainly seen from a distance.

Snares for trapping birds will be found useful, placed in natural hedges, gateways, and holes in trees. In the breeding season, when a nest of eggs is found, the old birds may be taken with a thin horse-hair snare, attached to a light rod. In this manner the collector can obtain a set of eggs and birds complete by destroying but one nest.

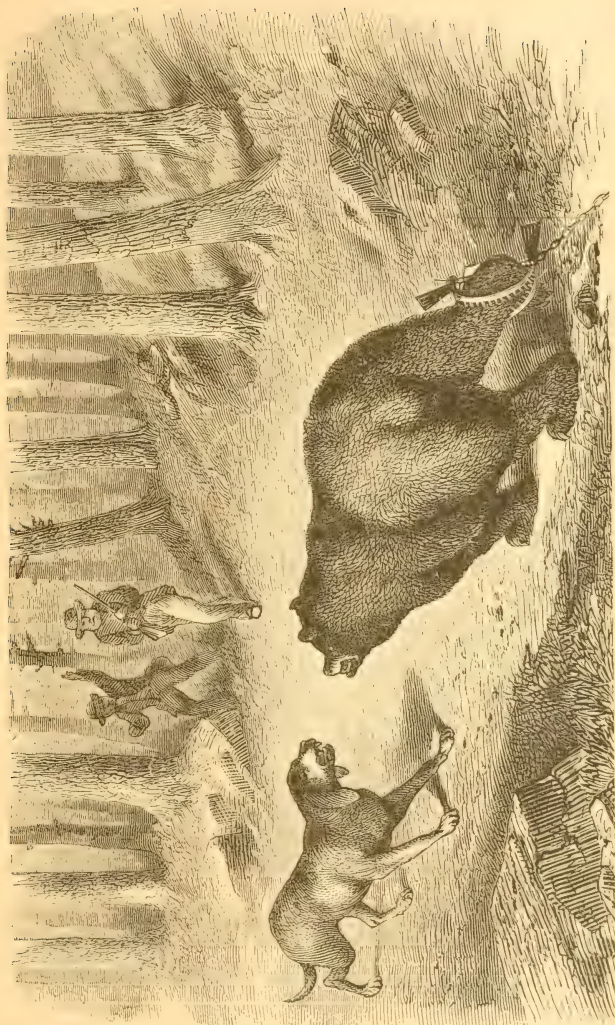
Some recommend bird-lime for holding birds, but it is so glutinous and adheres so tightly to the plumage, that specimens taken with it can seldom be used.

Large folding nets, as described in the Chapter on Collecting Insects, can be used in catching birds. Instead of employing a gauze covering, a fine meshed net is desirable, and should be used in the spring and fall, when birds are migrating. In these seasons the birds roost in the thickest cover, particularly in evergreen trees. Two or more

persons should employ the net at night. One holds it close to the foliage of a tree, while others drive the birds into the net by beating the opposite side. They fly against it and flutter down helplessly into the bag at the bottom, where they can be readily examined and set free, if not the species desired. Long nets can be placed about hedges and bushes, and birds be driven into them, though the number of specimens gathered in some localities will scarcely pay the ornithologist for his trouble.

On the sea-shore many species of gulls can be taken with hooks, particularly in winter, when food is scarce. The great black-backed gull, herring, ring-billed, kittiwake, and other shy species of gulls which are difficult to shoot, can be taken as follows :

Cut a piece of cork, with triangular sides, five inches long and one inch and a quarter wide. Fasten together by wiring, two large hooks on any side of this cork, so that the shanks extend about three-quarters of an inch beyond the end. Turn them until the points are nearly an inch apart, and weight the lower edge of the cork so that when floated the hooks will remain above water. A strong wire should run from the hooks to the other end of the cork and terminate in an eye in which a fish-line or cord may be fastened. A smelt or other small fish should be used as bait, being split open down the belly, and bound on the cork with white thread, back upwards. The fish should cover the whole cork and its nose fit closely up in the bend of the hooks. The whole should be weighted so that when floating nothing is visible but the bait and the bare hook-shanks. This should be anchored with a brick or something of about equal weight, so that there will be a few feet of slack line. The hooks will have to be set from a boat or a line attached to the anchor, which can be thrown out from shore. The baits should be set in the "track" of the gulls, which will not hesitate to take them. They never fail to seize the bait against the tide,



BRUIN AT BAY.



or head first, when they hook themselves in attempting to take in the head of the fish.

This is the only successful way to capture sea-gulls, which are even more wary than eagles and hawks. They will not take a bait on a sand bar, though it may have been covered by the tide, and all traces of the trapper removed. At a glance they can tell a trap on land and pass it by, no matter how tempting the bait may be. All along the Atlantic coast of the United States, and particularly on Long Island, I have taken many gulls in the manner described, when all other contrivances to capture them had failed.



CHAPTER V.

GUNS AND CASES FOR COLLECTING.



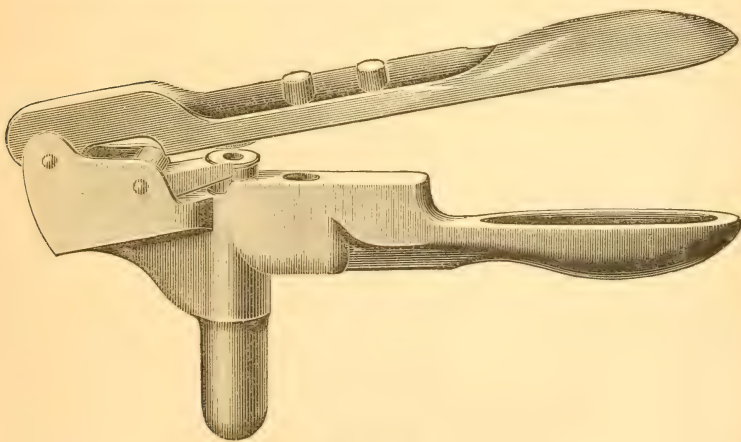
Charges in shooting should be varied, and the amateur, in particular, should know that one gun will not answer a general purpose. For large game, when shooting is rapid, the new Improved Winchester Repeating Rifle is, I think, a very superior weapon. It shoots a cartridge containing 75 grains of powder, and a bullet of 350 grains. This charge is powerful and sufficient to kill the largest American animals, though the weapon is also chambered to shoot more powder and a light express bullet, which charge gives an unusually flat trajectory up to 150 yards, making the rifle a desirable one for hunting in cover. In selecting any make of rifles, choose one which can be loaded, sighted, and discharged in the quickest time possible. Emergencies may frequently occur, when the wisdom of this advice will be signally illustrated. Celerity of movement is everything with the hunter. Reloading metal shells involves but little trouble and expense. Good cartridges and shells are essential for close, hard shooting. Rifle cartridges for long range should be evenly loaded with moist, slow powder. The Dead-Shot powder

is as good, if not better, than other brands for rifles. Quick, dry powders are much used for breech-loading shot-guns, but I prefer the ducking or medium brands.



CARTRIDGE.

It is all important to supply one self with ammunition which can be relied upon. Both the Winchester and the Union Metallic Cartridge Companies manufacture very satisfactory ammunition. Be sure to supply yourself with



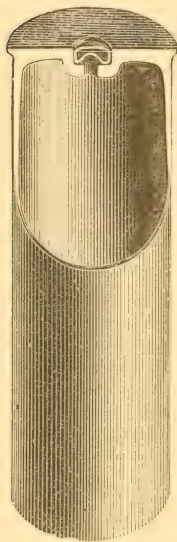
RELOADER.

reloading shells, which will stand hard and constant wear in long-range shooting—the most severe on the shells.

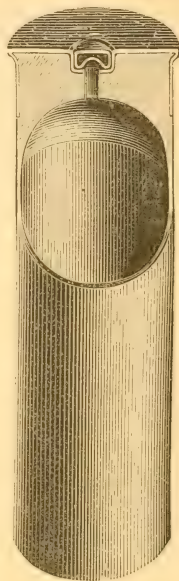
Reloading tools should be convenient and compact, particularly those which swage the cartridges for repeaters to the required length. The reloading tool illustrated

removes the old primer, inserts the new one, and seats the ball in the shell to the required depth. Hunters in remote districts will doubtless appreciate this reloader, as they can use it with economy, and always have a supply of fresh loaded cartridges in camp.

Good metal and paper shells for shot-guns are now made by several firms. During the past year a new primer has been invented, which is very popular with hunters, and promises to supersede all others. It is used in both metal and paper shells. These new primers are easily removed, and the shell can be quickly recapped and reloaded. They are easily seated and rarely miss fire.



METAL SHELL



PAPER SHELL.

In still-hunting antelope and buffalo on the open prairies, game is shot at unusually long range, and the Im-



CARTRIDGE FOR SHARPE'S HAMMERLESS LONG RANGE RIFLE.

proved Hammerless Sharpe's Rifle, model '78, is very desirable. For this rifle, special reloading cartridges are made, each containing 100 grains of powder and a bul-

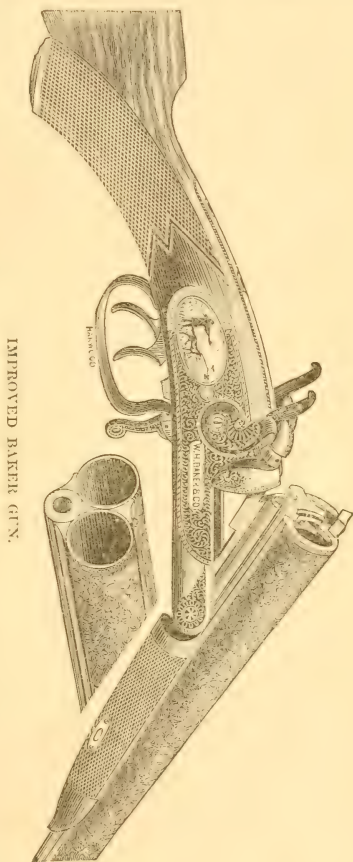
let of 550 grains. The hammerless rifles are made of any required weight, and chambered to use lighter cartridges for general hunting.

For water-fowl and large birds, a heavy double gun, 10 or 12 bore, should be used, and on small animals and birds a light double gun not larger than 14 bore.

The Improved Baker Gun is particularly adapted to the use of the collector. It constitutes a double breech-loading shot-gun and a breech-loading rifle. The rifle barrel is underneath the shot barrels, in the same position as a ramrod is usually carried. With this gun the naturalist can load for any kind of game from a warbler to a buffalo.

The Maynard Rifle is also convenient for collecting, as it has changeable barrels for ball or shot, which can be quickly substituted. The extra barrel can be slung from the shoulder, and is of little inconvenience to the hunter. The shells for this gun can be reloaded, and a suitable charge placed in them for all kinds of shooting.

The Remington Shot Guns are in great favor with



many. I used one during an entire season in Minnesota. One of the publishers of this volume tells me that he has hunted with a Remington for four seasons in the Eastern States, on the prairies and among the Rocky Mountains, and that he would not exchange it for any other make. It is specially well adapted for light work. The Improved Parker Shot Guns are highly regarded by some sportsmen, and I would recommend them in preference to guns of foreign manufacture. The Fox Patent Breech-loader Shot Gun, with recent improvements, is meeting with favor. It is a well shaped piece, and shoots hard and close. The new Colt's Breech-loading Shot Gun has recently come into the market, and will, it is claimed, be still more popular, owing to its cheapness.

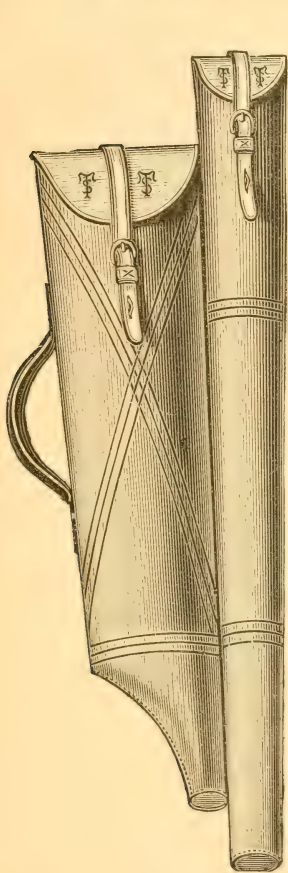
The blow-pipe is of great service for collecting warblers and other small birds. It should be made by encasing a long glass tube in wood, to prevent breaking. The ordinary glass tubes used by glass-blowers, make good blow-pipes, which should have a diameter of one-half inch, and be not less than six feet long.

To encase a pipe with wood, take two strips of straight-grained pine, and plane or "gouge" out a half-round groove the full length of each. Glue them together and wire firmly over the glass pipe. When the glue is dry, remove the wires, and plane the wood round until it has a diameter of an inch and a half; if smaller, it will sag, and not do good shooting. Putty balls should be used, and blown with a quick puff which is easily acquired by practice. The putty is thickened with whiting until the pellets will roll hard, but they should not be dry enough to crumble.

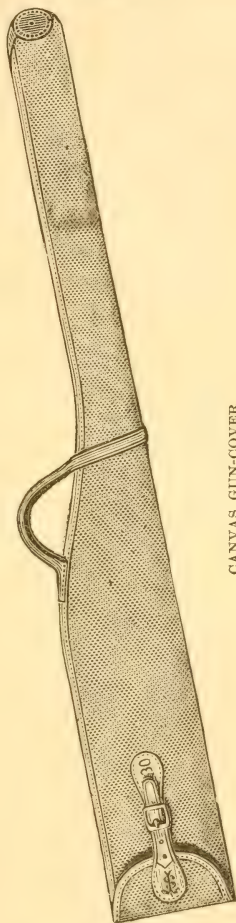
With this novel gun, I have killed as many as fifty-six beautiful warblers in less than a day, and spoiled but few specimens in killing. The blow-gun can be used in any place where a shot-gun would be objectionable.

To protect guns in travelling, or in camp, from hard

knocks, dampness, and dust, good serviceable covers are necessary. Guns that can be easily taken apart, like most



VICTORIA GUN-CASE.



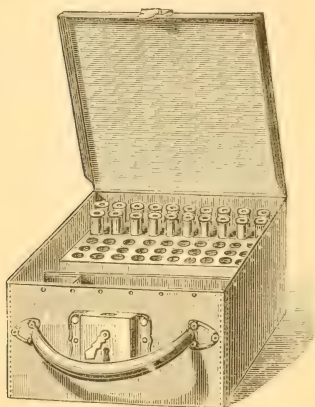
CANVAS GUN-COVER.

modern shot-guns, should be cased in as small space and convenient manner as possible. There are many arrangements, but the Victoria gun-case excels all others. It is

made of heavy leather or canvas, and is so well balanced, when packed, that it is readily carried.

For rifles and shot-guns, which have not detachable barrels, long cases are necessary. They are made in great variety of leather and canvas. Those of leather afford the best protection and are most serviceable, but they are too bulky for camp use.

The canvas covers are cheap and convenient. They will protect from dust and dampness, are easily used on the saddle, and can be folded and packed in saddlebags when the gun is in use. A strong leather handle facilitates carrying, and they will afford better protection in rainy weather than the fringed Indian buckskin cover.



AMMUNITION CASE FOR RIFLE.

Ammunition requires greater care than the gun. A wet or corroded cartridge that fails to explode, may often lead to loss of life or severe wounds from enraged animals. A gun can be cleaned and oiled in a few minutes, but a wet cartridge is both useless and dangerous. Many hunters carry their rifle cartridges over the dusty plains in narrow belts, and shoot them recklessly when coated with dirt, grinding the rifling out of

the guns, and ruining them for long range shooting.

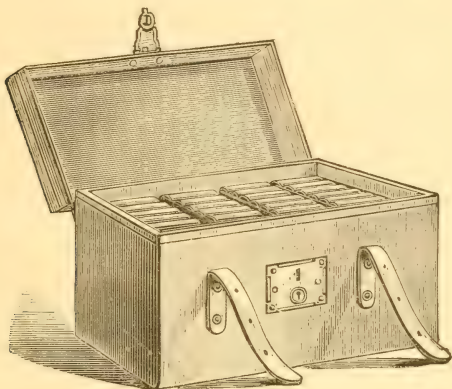
Compact ammunition cases are now made for both shot-gun and rifle, which hold cartridges, shells, ammunition and loading apparatus.

An ammunition case of sole-leather is the best, and carries a rifle's outfit securely and conveniently.

The shot-gun ammunition case is generally adopted by

sportsmen, and the compact manner in which it can be packed, makes it highly desirable for camp use.

With a case of this description, one can always have plenty of dry cartridges in convenient position. After returning from a hunt, cartridges that have been used can be reloaded and returned, and the full quota of the case



AMMUNITION CASE FOR SHOT GUN.

maintained. In making up ammunition, primers are preferable to caps, inasmuch as they are less susceptible to dampness, and will not miss fire if properly seated.



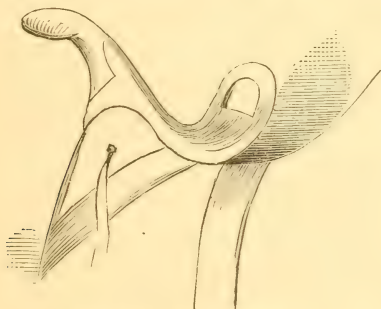
CHAPTER VI.

CARE OF GUNS.

A good gun is indispensable to the collector's success, and should have the best of care, particularly in remote districts. Some let their guns lie around camp like an axe, but the keen hunter early learns to care for and protect his weapon. A gun, like a watch, is useful if kept in good order, but worthless if neglected. It should be clean when in camp. Use in rainy weather should be avoided, and it should not be kept over night when wet without cleaning. A rifle needs even greater care than a shot-gun, and should not be carried all day in wet weather without the barrel being wiped out, or a shot fired. However slight the rust at first in the rifling, it will gradually increase until the gun becomes leaded, and shoots wild. Some writers assert that water should never be used in cleaning a gun, whereas it is the only fit fluid to remove burnt powder and lead. Others recommend kerosene, which, though effective in cutting dirt and rust, also eats the metal, and is ruinous to rifling. The oil of porpoises, seals, sea-birds, bears, skunks, wood-chucks, and the larger land birds, is good for guns, though refined sperm oil is generally used when friction occurs, and heavy petroleum oils to prevent rust. To clean a breech-loading shot-gun, remove the barrels from the stock, and swab them out with a damp rag, twisted tightly around the wiper. Dry them thoroughly, and work the oil over their entire surface by rubbing with a woollen rag. The dust may be removed from the stock and about the hammers with a stiff brush, and the whole should be oiled. The inside of the locks need to be cleaned and oiled but once or twice a year. The barrels of a muzzle-loader should be washed out in hot water, thoroughly dried, slightly heated, and oiled.

In the field, every precaution should be taken to prevent accidents. I have carried two sizes of coarse shot in my body for six years, hence the following precautionary advice : Central fire guns, with rebounding locks, are less liable to be discharged in handling than those whose hammers rest on the plungers or caps. Pin-fire guns are inconvenient, and even dangerous. Guns not having rebounding locks should be carried at half-cock when loaded, to prevent any discharge from a blow on the hammers.

When hunting in company, in cover, never shoot recklessly. Better let a thousand birds pass than shoot in the direction of a companion. In carrying a gun, see



GUN-SLING FOR SADDLE.

that it is never pointed at a fellow hunter. Do not draw your weapon after you through a fence, or over fallen trees and rocks. When alone, carry at a trail, or over the shoulder. In climbing hills in winter, examine the muzzle of your gun, and see that it is not filled with snow ; also beware of sand when lying in holes about the sea-shore. When in the saddle in an open country, carry a gun before you in a broad sling slipped over the pommel of the saddle. When mounted in cover, sling your gun from the saddle with two straps, underneath the left leg, and over the stirrup strap. I have carried two guns

a double shot-gun and a heavy Ballard rifle, daily for six months, when mounted, over some of the roughest trails of the Rocky Mountains, without accident or injury to the weapons.

When encamped, have a rack or slings for your guns, and never throw them about, particularly if loaded. When driving, place your weapons, if cased, in the bottom of the wagon, wrapped in soft coverings. If they are not cased, carry them between the knees, or let them rest between two persons across the middle of the seat. When in a boat, have racks for them, forward of the middle seat, or place their butts against a shoulder, where they will not slip, with the muzzle pointing forward, and over the gunwale. In a yacht, guns may be slung over the trunk, or placed in the back of the bunks. No matter where you are hunting, there is no excuse for the careless handling of guns, thereby perilling your own life, and the lives of others.



CHAPTER VII.

COLLECTING ANIMALS.



There are nearly three hundred different species of animals in North America. Great experience is required in trapping and shooting many of them, and much time and labor are often required to find them. A set of steel traps will serve the collector well and en-

able him to take many nocturnal animals that seldom venture out during the day. In making a large collection the zoölogist will have to visit many localities.

On the low lands of the West he will find mice, shrews, gophers, prairie-dogs, badgers, foxes, skunks, etc.; in the wood lands, white-tailed deer, bears, panthers, wolverenes, hares, rabbits, beavers, raccoons, and other animals. In the timber on the higher mountains, the marten, lynx, wild-cat, mule-deer, mountain-rat, squirrels, and weasels abound, while in the beautiful green pastures above the timber line, twelve thousand feet above the sea, black-tailed deer, mountain-sheep, and hares are found. Still higher, in the rocky alpine peaks, the loud, sharp, startling whistle of the marmot, and the faint squeak of the little chief hare are heard.

For collecting everything, except the larger animals, a breech-loading shot-gun is the best, and cartridges should be loaded with various sizes of shot, so that the gun can be quickly and properly brought into play for any game sighted. For shooting long distances, a few of Eley's wire cartridges should be put into shells, with heavy charges of powder. The cartridges should be numbered on the wads, so that their contents can be determined at a glance. A set with different sizes of shot should be carried, and a cartridge vest is the most convenient for holding them.

For general use nickel-plated metallic shells are best, particularly when shooting in damp weather.

When camping, and transportation is limited, loose ammunition can be carried in small space, and metal shells loaded when required. This often obviates the carrying of a large quantity of paper shells or loaded cartridges.

When hunting animals, one should be prepared for anything, from a deer down to a mouse, as he never knows what a day may bring forth. With the exercise of due care and forethought, one may have quite a collection

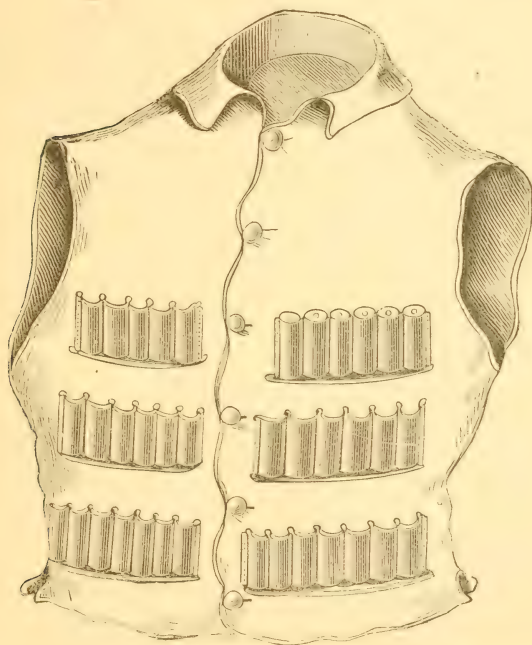


LITTLE CHIEF HARE.

in a few weeks' time. Game is often seen when least expected, and it is aggravating to "jump" several deer or elk from cover when you have only shot cartridges for small mammals.

When in search of large game, a good "shot" should depend wholly upon his rifle, and now we have those as near perfection as hunters can hope for.

In collecting animals, the hunter should search for



CARTRIDGE VEST.

them morning and evening, particularly when hunting the ruminants. Evening is the best time for finding such animals as elk, deer, antelope, and mountain-sheep. They regularly go to drink just before sunset, and their watering places should be watched. In a mountainous

country the main trails leading to streams in the valleys can usually be reconnoitered with success. The larger carnivorous animals start on their peregrinations at evening, and the still-hunter will find them coming out from their beds and cover when the sun disappears over the mountains, and the bottoms begin to be shaded.

With the approach of darkness, animals feel more secure from danger. They wander slowly about, feeding, and are not so liable to see the hunter as at other times. In the morning they are on the alert, travelling hurriedly in search of secluded places to rest for the day. Although watchful at such times, they are often killed by the hunter, who easily sights them when moving.

During the rutting season, ruminants are travelling about during the day, and the hunter is liable to meet them at any hour, though the uplands are most frequented by them.

Many of the smaller animals are easily snared, such as skunks, and the larger rodents. A spring-pole should be used for hares and rabbits, etc., though prairie-dogs and gophers can be taken by placing a snare attached to a string, over their holes, and quickly jerking it when they poke their heads out to watch. In this manner, I snared thirty-seven for scientific purposes, in a village on the plains of Montana, when it was almost impossible to get one with a shot-gun, as, when killed, they dropped down their tunneled holes like the badger and woodchuck.

Strychnine is one of the essentials for collecting animals, as there are but few species that refuse to take it when in bait. Poisoned animals are always in the best condition for mounting, as their feet are not lacerated with traps, or their skins perforated with shot or bullet-holes.

CHAPTER VIII.

PREPARING ANIMAL SKINS FOR MOUNTING.

Animals in warm weather require immediate attention, especially in localities east of the Mississippi Valley. Pelts that would dry in fine condition as they were taken from the carcasses on the great plains of the West, would spoil in a day's time, at the same season and in the same latitude in the Eastern United States.

The most perishable pelts are those of rodents and certain parts of the skins of ruminants ; vegetable matter in the viscera ferments, causing decomposition in a few hours. Carnivorous animals remain in good condition the longest, though all pelts keep best if they are removed from animals when warm.

After a large animal is killed, measure and make notes of dimensions. If the contents of the thorax are removed at once, the body will cool and stiffen in good condition within a few hours. Blood should be scraped from the hair with the hunter's knife, and any remaining, washed off. Water should not come in contact with the flesh, however, more than is necessary, as it hastens decomposition. Large animals should be skinned where they fall, if time will permit ; as in packing on the back of a horse or mule, they are subject to many hard knocks while crossing rocks and fallen timber, and the chafing of tightly drawn lariats is by no means conducive to their preservation.

When the hunter unexpectedly kills game, and perchance, finds himself standing over a dead elk, ten miles from camp, with only his "scalper," and the sun an hour high, it is best to proceed as follows : If the horns are embedded in the earth, raise them carefully with a lever, and turn the animal on its back, propping him with short sticks. Fasten the ends of two lariats with a double

“hitch” around the fetlocks, and spread the fore-legs by making the ropes taught to trees or stakes. Commence skinning, by slitting the skin from the breast down the belly to the tail; also open the hind-legs on the inside, from the incision made, nearly to the knees. Flay as far as convenient, and unjoint the hind-legs at the socket-joints of the hips. Sever the tail, slack one rope and turn the animal on its side. Raise the trunk, pull the skin from under, and flay to the shoulders. Release the fore-legs, remove the skin as far as convenient, and disjoint at the scapulars or shoulder-blades. Continue skinning half way up the neck. Return the trunk and head, horns upward, and prop in position. Make a cut through the skin across the skull, commencing at the middle of the base of one antler, ending at the same place at the base of the other. Place the knife in the middle of this incision and run it down the back of the neck nearly to the shoulders. Flay around the neck, remove the skin neatly and closely from the burrs of the antlers; cut the ears through at the base, unjoint the first cervical vertebra from the skull, and sever the head from the body.

Carefully remove the skin from over the eyes, and be cautious that you do not cut through the skin below them. Free the pelt from the skull, taking the lips with it. Flay the legs down from the shoulders and hams as far as possible; then slit the legs up their backs from the hoofs nearly to the elbows and knees. Skin around the bones, disjoint the legs at the wrists and ankles, draw out the bones, and the skin can be folded and carried behind the saddle. The skull and leg-bones should be cleansed and preserved.

When reaching camp, spread the hide, flesh side up, and thoroughly cleanse it, removing the lean meat of the lips, but leaving the black skin forming the under covering attached to the pelt. Flay the feet down closely to the hoofs, and “prime” them, as well as the whole pelt,



A GROUP OF SHREWS.

with alum, salt, and saltpetre. Dry the skin as quickly as possible in the open air, without exposing it to the sun. The skins of all large animals may be prepared in this manner, except those with small heads, without antlers or horns; then, the incision in the back of the neck is omitted, and the neck-skin is turned inside out and drawn over the head.

Before large animal skins become dry enough to crack, they should be given a heavy coat of arsenical soap, and folded in as small a space as possible to facilitate transportation. Elk antlers are "elephants" at camp, in a wagon, or on a mule's back, and no little pluck is required in transporting them through a hunting campaign. In travelling, they should be lashed on the bows of a wagon, on the bow of a boat, or on the top of a pack-mule's load. In the latter case, the mule should be led, for if it once begins "bucking," trouble, and plenty of it, follows. I have seen a good mule killed by "snagging" himself on the antlers of an elk swung over his back.

The skins of small animals should have but one incision, that made from the middle of the thorax, down the belly to the vent, and should be removed in the same manner as those of larger animals. The skulls are left attached to the skins by the lips, which are split from the inside. The leg-bones should be left hanging to the feet. The flesh sides should be primed with pulverized alum, salt, and arsenic, the skulls filled with stuffing, the leg-bones wrapped with the same, and the skins returned in natural position, and filled out. The smallest of skins are usually sewn together down the belly, and covered with wrappers of thin paper or sheet cotton. Some skins are much more difficult to prepare than others. Those of the bear, porcupine, seal, etc., should be thoroughly cleaned of fat by scraping with a dull knife. The tails of most animals are easily drawn when started from the base with a knife. The thumb-nail will strip the

tail of any animal up to the size of a squirrel. For drawing the tails of large animals, wood-clamps are necessary. The clamp consists of two strips of board, fastened together with a hinge at the extremities, shutting evenly, and having rounded ends for handles. Holes of graduated sizes are made in the same manner as semi-circular holes, in each half of the tail-clamp, which, when open, can be closed around, to fit any sized tail, and it can be easily stripped.

The tails of the porcupine, beaver, otter, and muskrat, resist all force, and must be split from the under side, carefully skinned, and well primed with preservatives. Tails that are drawn should have preservatives inserted with a wire or piece of cane through their entire length. Unmounted skins need much care to prevent the attacks of insects, especially from the Skin Beetles (*Dermestes*), the collector's worst enemies; these scent the skins from afar, and fly directly to them at night. There is a large *Dermestes* on the Northern plains which has a remarkably keen scent, and is almost as numerous as mosquitoes on the salt marshes of the East. I have had them strike the scent of a bag of ducks I had killed on the Milk River, and, when on wing, turn short about and come straight for their blood. As far as the eye could reach, a line of them was seen pressing onward against a strong wind, toward the dead birds, which they soon covered, and attacked with unwonted voracity.

The common Eastern species is at work during nearly the entire year, though it does the most mischief in the months of May and June. Beat your skins often with a rattan, and the beetles will fall on the ground, when they can be destroyed before their eggs are deposited. A related beetle (*Anthrenus*) causes great destruction to carpets, is known by the absurd name of "Buffalo Moth."

CHAPTER IX.

TO PRESERVE A BUCK'S HEAD FOR MOUNTING

Make a cut across the top of the head, from the edge of one horn to the other. Then run the knife from the middle of the head and from the incision made, down the back of the neck to the shoulders. Cut the skin around, and a little below the neck, until it is free from the shoulders, and continue to flay up to the ears. Sever them at the base, and skin to the bur of the antlers. Cut the pelt away from around the horns, and remove it to the eyes. Sever the skin from the eyes, being careful not to cut it at the cavities near them, and flay down over the muzzle. Skin the ears part way down. Trim away most of the flesh on the under side of the lips, and rub the whole flesh side of the hide with powdered alum and saltpetre. If no other preservative is at hand, use salt.

Turn the flesh side to the open air, and dry as soon as possible. The skin will shrivel up like an old boot-leg, but it will be in a good state of preservation for mounting. Enlarge the hole in the occipital bone, remove the brains, clean the skull, and prime it with any preservative.

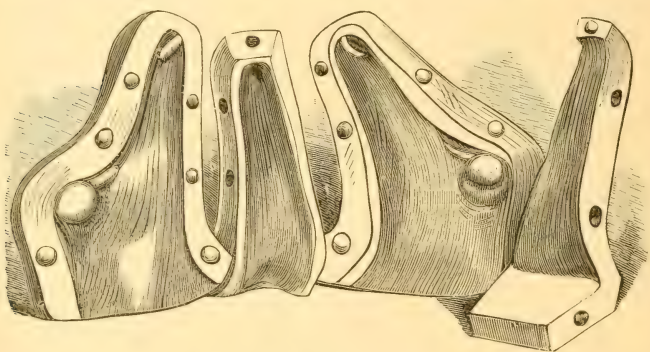
Never cut a deer-skin down the front of the neck, as it makes an ugly-looking seam to mar the beauty of a head. Should a deer be wounded or killed, it is not necessary to behead the victim, in order to bleed him. If shot through the lungs or near the heart, bleeding is not required, as the blood will settle in the thorax, and can readily be discharged when the deer is dressed.

Any animal's head can be preserved in the manner described, but the cut across the top of the head should not be made in the case of females, not having horns.

MOUNTING HEADS, ANTLERS, AND HORNS.

The heads of the various wild ruminants, and those of the larger canivorous animals, when well mounted, make showy and life-like ornaments. Even the heads of domestic animals, such as the bullock, goat, sheep, dog, etc., can be made attractive for halls, dining, and club-rooms. To succeed well, a knowledge of their anatomy and characteristics is necessary, and great care should be taken in modelling.

The average sportsman can preserve and mount a head with fair effect, after a few trials ; but good mounting of large animals requires considerable practice and experi-



MOLDS FOR CASTING HEADS

ence. I employ two methods for mounting heads. The first is on a cast : Remove the skin as in the preceding chapter ; clean it of all loose flesh over a currier's board or smooth piece of wood with a convex surface. The fleshy parts of the lips and the flesh about the ears must be carefully removed with a small knife. When cleaned, place in pickle over night, or until wanted. I have successfully kept skins two years in the pickle described elsewhere. It cleans the skin and coat, partially tans the hide, and prevents the hair from falling out. Next, holding the



LYNX.

horns, saw off the top of the skull, from the top of the eye-holes back to the upper part of the hole in the occipital bone; clean it well, and it is ready to fasten on the cast.

In order to have a perfect cast, take a mold of plaster from a shaved head; though, with sufficient ingenuity, a head can be modelled from plaster. The mold should be in four pieces as seen in the illustration. See also page 167.

When making a cast, the molds should be well greased, tied tightly together, and run full of thinly-mixed plaster. A piece of board, with a wire put through it to run down into the snout, should be thrust into the plaster, until it bears against the front, and rests on the top of the mold.

Some heavy weight should be laid on the wood, in order to keep it from rising until the plaster is "set." In five or ten minutes' time, the cast will be hard, and can be readily removed. It is better, however, to let the mold remain about an hour before removing the cast, which should be well heated and dried.



NECK BOARD.

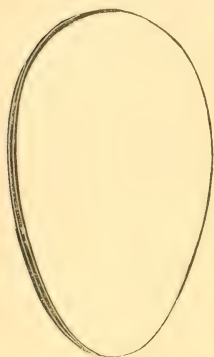
The first cast should have the top sawed off just above the eyes, in order to make space for, and to fit the portion of the skull holding the antlers. The eye-holes should be scooped out so that the glass eyes can be set in clay or cement. All imperfections on the cast should be corrected, and it may then be used like a natural skull, thereby obviating the necessity of sawing and excavating the eye-holes, should a number of casts be made. If a head has a long neck, the board can be pieced as required: a base-board can be screwed on to fasten the skin to, and to give the neck the proper form.

If the head has but a short piece of the neck skin at-

tached, the board in the cast will be long enough, and should have a long base-board for the neck, as shown in the illustration.

The horns should next be fastened to the skull in this

wise : With a brace and long bit, bore two holes into the top of the skull, about two inches apart, and so arranged as to be directly over the wood in the cast. Countersink the holes to receive the heads of the screws, which should be long and run deep into the wood in



BASE-BOARD FOR LONG
NECK.



BASE-BOARD FOR
SHORT NECK.

the cast, thereby holding the horns firmly in position. Perfect the anatomy by modelling with potter's clay, where the skull bone joins the cast, and the head is ready for covering.

The skin should be well moistened on the flesh side with arsenical soap, and drawn over the cast ; and the neck-board should be fastened in a vise, with the cast and horns upright, to facilitate sewing. Waxed hemp-twine and a heavy three-sided, post-mortem needle is best adapted for sewing up the skin. Gather the skin around each antler ; draw it tightly about the base of the horns, by slightly puckering, and tie fast. Take a stitch through the two points of skin at the base of each antler, and tie firmly. Sew with the two strings from each horn to the middle, by cross-stitching from the under side ; then tie tightly together, cutting one string, and leaving the other to continue the seam down the back of the neck. Close the

neck half-way down, push clay under the skin about the horns, and model in natural form. Fasten the eye-holes over the cavities in the cast, by driving three-quarter inch wire-tacks through the skin, at the inner corners of the eyes, into the cast at the small holes below the eye-cavities. Model about the eyes by inserting clay through the eye-holes of the skin. Tuck the skin about the mouth underneath, between the cast and skin, in order to keep the muzzle from drying and shrinking, and to prevent the skin from being worn off in the process of mounting, through constant rubbing on the bench. Finish the seam down the neck, draw the skin tightly, and nail it to the middle of the top of the base-board. Remove the head from the vise to the bench, draw down the neck-skin tightly, and nail it to the sides of the base-board. This will

prevent the neck from being forced out of natural shape in stuffing. Now commence stuffing, by forcing, with a crammer, small bunches of excelsior under the skin, between the nails, upon each side of the neck-board.

The crammer is made of round iron or steel, diameter $\frac{3}{8}$ -inch, length, 18 inches. One end is flattened, notched,



CAST READY FOR COVERING.

and turned a little one side, like a tack-lifter; the other end is driven into a large wooden handle. Crammers of various sizes will be found useful in all kinds of work.

Continue to stuff the neck until it is hard and has the desired shape. Draw down the skin tightly with pliers, and nail it firmly all around the edge of the base-board. Put a large screw-hook in the top of the base-board, to hang up the head and facilitate the work about the muzzle. Turn down the skin covering the under jaw, crowd a little clay under it, around the edges, and nail in position with round nails, which pierce the plaster without cracking.



END OF CRAMMER.

Pull down the nose-skin, fill out the nostrils slightly with clay, also the lip, and turn in the dark skin of the lip over the clay, so that the line where the hair commences will form the outline of the sides of the mouth. It will be found necessary to make a narrow fold at each corner of the mouth, in order that the skin

may lie naturally. Secure it with wire tacks. Drive a small nail part way into the center of the nose, to hold the muzzle in position when drying. Model the nose, insert the eyes, and perfect the anatomy around them by modelling. Crowd the ears full of clay at their bottoms, and sew pasteboard on their insides, to hold them in position, until dry. Model them in pricked position, connect, and draw them slightly together with a needle and thread, and dress down the whole coat with a fine metal comb. Coat the hair well with thin flour paste, applied smoothly with a stiff brush, and hang up to dry.

When thoroughly dried, remove the pasteboard from the ears, comb out the hair and brush it clean. The paste will come from the hair in small scales, carrying

dirt with it, and leaving the coat smooth and glossy. Draw the nail from the nose, perfect the nostrils with putty, also the under parts of the eyelids, which will give them the appearance of resting close on the eyes, as in life. Paint them neatly with cassel earth, also the muzzle, and when dry give the same a coat of varnish. Clean the horns with a damp brush and cloth, and varnish them when dry.

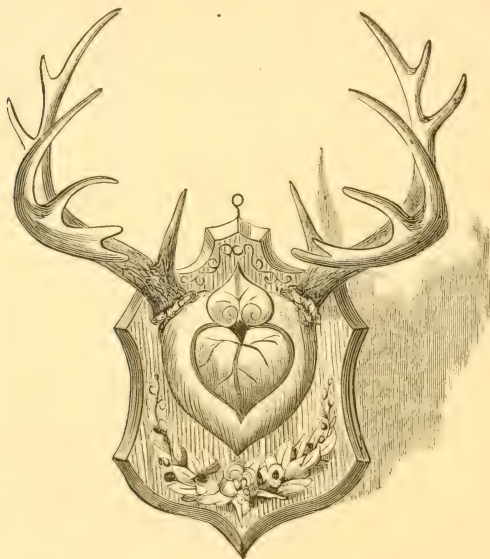
The head can be fastened on a shield, by running long screws through it from the back into the base-board of the neck. The screw-hook should be removed from the neck-board to the shield. The second method of preparing heads, is what may be called mounting heads on the skulls. To do this, prepare the skins as in previous method. Clean the skull and dry well. Fill the brain cavity with plaster, and insert an iron rod, bent double, inside the skull. When the plaster is well set, perfect the anatomy of the skull by modelling with the same. Make a base neck-board as in the first method, running the iron through it and clinching it in position in a groove, with wire staples, that it may not prevent the shield from fitting closely. Bend the iron to the desired curve, and complete as in first method.

When mounting large heads, such as those of the buffalo, elk, moose, caribou, and ox, two irons are placed in the skull, with the neck-board fastened and clinched between them. To prevent the head from being too heavy, the anatomy of the skull is built out with pads of excelsior and perfected with clay or cement.

Owing to the great size and awkward proportions of elk antlers, they can be separated in order to facilitate packing, by cleaving the skull lengthwise. Where, however, transportation is available, the skulls should be kept perfect, as separating necessitates much after trouble and extra labor for the taxidermist. The solid portion of the skull is small and frail for holding fastenings with which

the heavy antlers, once separated, are brought together. When a skull is cleaved, a thin-bladed, sharp, regularly and closely set saw should be employed, making as few shavings as possible, to the end that the parts may come together evenly, when the head is mounted.

To fasten a divided elk head together, prop the antlers in natural position, and bind with annealed wire. Twist



ANTLERS PROPERLY MOUNTED.

one piece tightly round the back of the skull, a second, around it and through the apertures back of the eye-holes, and a third piece around the nose, just forward of the grinders; the head is then fastened temporarily. Drill horizontally through the skull with a $\frac{3}{8}$ -inch bit, starting about 3 inches below the burr of the antler. Fasten with a snugly-fitting bolt, having a square head, and a washer under the nut. Put a smaller bolt in the same

manner through the skull, between the tusks and grinders, and screw up tightly. Wire the under-jaw firmly in position, and run the cavities of the skull full of plaster. This will make the whole solid and strong. A neck-board can then be mortised and bolted in the occipital bone, which, in large heads, is preferable to irons.

If antlers are mounted only, the skull should be cut down so that the horns may have the proper position when fastened on a shield. They are best secured by long screws, and the skull braced by cement. Pieces of black-walnut should be fitted closely around the burr of the horns, and glued to the shield, when they can be carved to any design. The skull can be wholly concealed by composition work, and ornamented with Grecian leaves, imitation of natural leaves, or any design of wood-work. The outer edge of shields should be carved ogee pattern, and the faces may be ornamented with light raised composition work, or chased and inlaid with black or gold.

Horns of mountain sheep, goats, cattle, etc., having a porous bone filling, often come loose from the skull when dry. They may be fastened to the skulls, by pouring a little thin plaster in them, and quickly replacing them on the skulls.

Large, curved horns are usually mounted on heads carved in full, as they are awkward in shape when mounted on shields. To finish off any carved work in walnut, give a coat of shellac, dissolved in pure alcohol, and, when dry, rub off lightly, using chamois skin, moistened with kerosene.

CHAPTER X.

MOUNTING ANIMALS.

Taxidermists have various methods of their own for mounting animals ; whatever mode, however, they may pursue, the exclusive use of soft stuffing is an error.

Mammals can be well mounted in but two ways. One is to form a body complete, and place the skin over it ; the other plan is to model the head and neck, make the legs and insert them separately, fastening each one to the artificial back-bone, and then build out the body until the anatomy is perfected. Seals are mounted in this manner.

The first method is usually employed in mounting large, thick-legged animals, such as the bear, panther, wolverene, raccoon, lion, tiger, jaguar, etc. In mounting short-



ARTIFICIAL BACKBONE.

haired animals by this method, the seams down the legs should be made in the neatest manner, or they will disfigure the specimens. For mounting a bear by

first making the body complete, proceed as follows : Pour the skull full of plaster, insert a stout iron rod, bent double, inside the skull, and when the plaster is set, it will be immovable. Next make an artificial back-bone of one and a half-inch pine plank, shaped as in the illustration.

Bend the neck-iron double, and clinch to the side of the board with wire staples, allowing the proper length for the neck. Then, with small annealed wire, fasten the leg-bones to the leg-irons, bending them at the joints to the desired shape. Build out the anatomy of the legs and quarters by winding pads of excelsior, or tow, with string. Substitute the main cords of the hind legs running from the hocks with wires having a covering of cot-

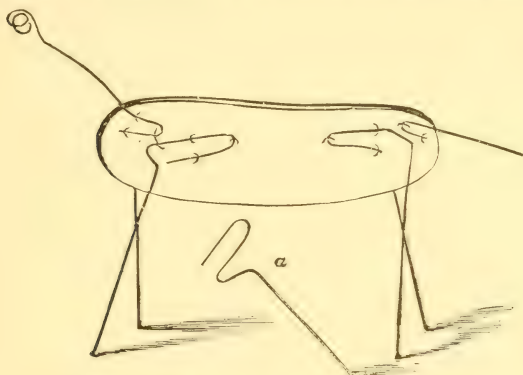


COMMON OR HARBOR SEALS.

ton or jute. Drill holes into the projecting bones of the hocks, and fasten the wires by inserting the ends. Give them the proper curve, and lash the other ends to the legs. Coat with thick glue, to give an even surface, body, and strength. When the legs are formed, bend the projecting irons in this manner. (See illustration, *a*.)

Fasten them in position on the board, by drilling sets of double holes for the irons to lay between, and clinch wire staples over them, one set of staples holding both irons.

Reverse the bending of the irons to the hind legs, and



POSITION OF IRONS IN A LARGE ANIMAL.

fasten them as described. When leg-bones are not with the skin, the latter should be placed on the floor, doubled lengthwise, or as near natural as possible, and wires bent from the skin, to give the proper length and bend of legs. Wood, shaped according to these wires, may then be used in place of the bones.

An artificial skull can be carved of wood, in full, or set with teeth of bone, or the solid tips of deer horns. Should you wish to reserve a skull, mold one of cement, or, what is much more substantial, take impressions of the teeth and jaws in plaster, smoke the molds with a

candle, and run them full of tin, slightly alloyed with lead. Fasten the castings on a wooden skull, file the teeth, and burnish them. When finishing an animal, a mouth made in this manner may be painted and varnished to look as natural as life, with flake-white, Chinese vermillion, cassel earth, and white varnish.

In mounting animals, with long tails, such as those in the genera *Felis*, *Canis*, *Vulpes*, etc., after the head and legs are secured, a support for the tail is made by fastening a wire, having jute wound tightly around it, to the board. In preparing short-tailed animals, such as bear and mountain-sheep, the tail-wire is made long and run into the body.

Next, the whole anatomy of the body is made by binding on pads of excelsior. The dummy is then fastened on a stand with washers and nuts, or by bending the irons under, plugging the holes tightly around them, and fastening with the wires as described. The paws take considerable room, and space should be allowed for them.

The skin is next cleanly curried, coated with arsenical soap, and laid on the body. The skin should be drawn together at those points where it would be liable to fall short, were the body too large. If a good fit is made, commence sewing up the legs, cross-stitching from the inside. In process of sewing, any imperfections in the anatomy can be corrected by cramming stuffing under the skin. The feet should be modelled wholly in cement, and nailed in position, and the lower parts of the legs may be modelled in clay over the excelsior, if necessary. In mounting short-haired animals, it is best to model the legs in clay or cement, and imbed it well in the material of the body. When the last seam has been closed, the whole coat should be combed out with a fine metal comb.

Now comes the modelling of the head, which is the most difficult part. An expert can model any common animal's head from memory, but casts taken from ani-

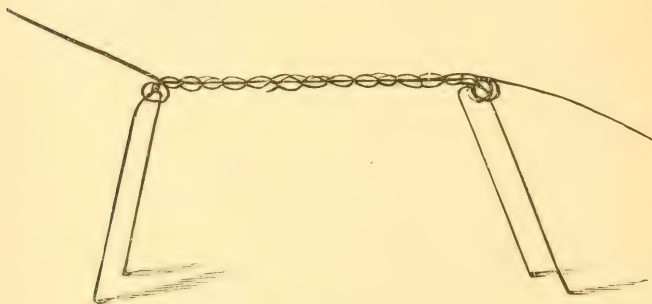
mals in the flesh will be found very useful for beginners. It is not necessary to have a cast from a whole head. Take impressions, in plaster, of one eye, the nose and lips, and from these, clay casts may be made, in a few seconds, which will serve as models.

The anatomy of the head should be first "roughed out" over the skull with plaster or cement. The skin should then be tacked in position, with the eyes straight. The under jaw is modelled first, and the skin covering it held in position by stitching across the inside of the mouth. Small wire tacks may also be used in favorable places; when a wooden skull is used, the tacks may be employed altogether. The nose should be well filled with clay or cement; a mixture of plaster and glue is very substantial, but it hardens so quickly that it can only be used by experienced hands. The skin of the lips should be turned in under, it being full to the natural thickness. The upper lip is next formed into shape, and worked down to a natural position. The features are gradually worked out, the eyes set, the ears erected by sewing on pieces of pasteboard, the hair on the head combed and brushed smooth. The animal is then ready for drying. When dry, any shrinkage in the eyelids, nose, or lips, should be filled out by modelling with white-lead, thickened with Paris white. The eyes, lips, and claws should be painted naturally, and varnished.

When mounting an animal with the mouth closed, a crude wooden skull will answer if the head is properly modelled. To finish a head with mouth open, as for example in the case of the peccaries, wedge the jaws apart, and draw back the lips to show the teeth. When the head is dry, remove the wedge, model the throat in cement, and cast, model, or carve a tongue, with two sharp wires in its base for thrusting securely down the throat. Model about the bottom and under the tongue, connecting it naturally. Paint usually with vermilion, flake-white, and cassel

earth, and, when dry, varnish to give a moist and natural appearance.

The second method of mounting animals is generally preferred when the skins are green, and removed as described in the Chapter on preparing animal skins for mounting. The neck-iron is fastened in the skull, the legs made, and the board used as in the first method. The head is pushed up the neck-skin, and the iron fastened to the board, and the legs made. In mounting some of the larger ruminants, like the giraffe, elk, caribou, and deer, it is necessary to insert the leg-irons slightly into the bones at the joints, to prevent them from being too prominent. The legs are worked down the skin in position,



MANNER OF WIRING SMALL ANIMALS.

and fastened to the board as described. The body is then filled out by using crammers, and the animal completed as described in the first method.

In mounting small mammals, the artificial back-bone, or board, is not used. The neck-wire is employed as back-bone. It should be a few sizes larger than the leg-wires, sharpened at one end, and turned double. The long end is run through one nostril cavity, out of the hole in the occipital bone, the short end filling the other nostril cavity, and being drawn in tightly. In heads of some animals it is necessary to clinch the neck-wires through



PECCARIES.

the skulls. Where the leg-bones would naturally join the spinal column, two rings are twisted in the neck-wire, through which the leg-wires are run, and twisted firmly around the neck-wire, meeting or overlapping between the rings. When the skull is attached to the skin, as is usually the case in small animals, it is roughly modelled with potter's clay before the skin is turned over it. Owing to the connection of the skin and skull, the head is easily modelled, and the eyes are readily set. The body is bent in position, and filled out, prior to being mounted on a stand.

An experienced taxidermist can do fine mounting by casting an animal in parts, of plaster, and putting a flat skin over the cast. In perfecting the anatomy of large animals, it is often necessary to sew through the legs, and to run bent wires into the body at different points. No rules can be given for this kind of work. The learner must rely upon his own judgment in bringing out muscles, and perfecting the general form. Animals mouths may be "done" open in wax, and shaded in dry colors, rubbed in, and the whole varnished.

Skins of all animals should be soft and pliable before mounted. Dry skins should be well immersed in pickle, and be thoroughly cleaned. During cold weather, well-cured skins may be placed in pure cold water a day or two to soften, as it softens them much quicker than pickle will. All skins need to be well tanned in a brine of alum, salt, and saltpetre, to set and clean the hair before they are mounted.

CHAPTER XI.

PREPARING AND MOUNTING SKELETONS.

Cleaning bones is unpleasant labor, and collectors do not engage in it with the same enthusiasm which they feel in preparing other specimens. Zoölogists, however, who know the scientific value of a good skeleton, will work eagerly and industriously, when a rare mammal's frame is to be had for the cleaning. The amount of labor required to prepare a skeleton, is over ten-fold that of mounting the skin, though, when once cleaned and artificially articulated, in a scientific way, it becomes the most valuable part of the animal.

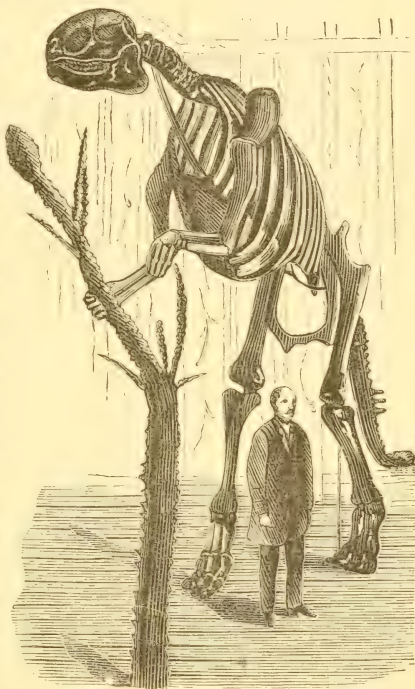
When travelling by pack-train, and canoe, I have often had my patience tried with the care of skeletons, and the great majority of hunters and collectors cannot be interested in skeletology.

In the air of the plains, an animal's frame will dry untainted, if trimmed closely with a knife; but in the East, or, in the mountains of the West, skeletons should be thoroughly cleaned at once, or they soon become offensive.

The frames of various animals are so different in substance and articulation, that no general rule can be given for preparing them. Wire and cement are used in artificially articulating small skeletons, and heavy irons, pins, and bolts, are employed in mounting large ones.

In cleaning the frame of any animal, watch the bones, particularly when separated. At an unguarded moment, dogs, cats, rodents, and birds, will destroy or carry them off, and careless companions will break or lose them. In caring for old skeletons, watch the teeth and claws, to see that they do not fall from the skulls or tender pelts.

To clean a large skeleton, carefully unjoint the first cervical vertebra from the occipital bone. Remove the brains without disfiguring the occipital orifice, and clean off all flesh, without injuring the two small bones at the root of the tongue, and the gristle about the passages of the nose. Sever the shoulders from the trunk, by drawing the knife between the scapulars and thorax. Unjoint the hams from the hip-bone. Clean the legs by splitting the flesh to the bone on one side, and remove it in as large pieces as possible, inasmuch as it will leave the bone easier than when removed in small flakes. Unjoint the cervical vertebræ from the



SKELETON OF THE HADROSAURUS.

thorax, and clean both by constant trimming with a knife. Great care should be exercised in cleaning the chest, so that the small gristly elastic ends of the ribs are not cut.

Skeletons can be most substantially prepared without boiling, or the use of lime, though more labor may be required. When preparing a fresh skeleton, vigorously rub the bones with sawdust. It will remove small particles of flesh, and is a good dryer. It is necessary to sep-

arate the bones of a large skeleton, to clean them, and the larger bones should be exposed to the sun, then stripped and carefully scraped.

The spinal column requires more labor in cleaning, than the rest of the skeleton, on account of its inconvenient shape and the work of removing the tough tissues which connect the vertebræ.

The quickest and best way to prepare a skeleton, is to sink it in the sea, if practicable, in a small-meshed net bag, with a buoy to indicate its location. The thousands of small marine animals will clean out every cavity more rapidly and thoroughly than man can do the work. The Bay of Fundy is one of the most favorable places in the world for preparing skeletons. I have completed the cleaning of very large seals in its waters, by sinking them for a period of twenty-four hours only. So numerous and voracious are the marine animals, that the frame of a large fish will be bared in a single night. Portions of a skeleton may also be buried in an ant-hill, and the occupants will soon clean the bones. If the skeletologist is preparing his collections where marine animals or ants cannot be utilized, and he wishes to accomplish his work quickly, he will have to resort to boiling.

The bones should be cleaned with a knife, and then boiled until every particle of flesh leaves them. During the process, the water should be frequently changed, so that the grease will not settle in and discolor the skeleton. The bones should be slowly boiled at first, and for several hours, before the flesh begins to leave them. They should occasionally be taken from the pot, and loose particles removed, in order to hasten the work. Boiling frequently causes the caps of the larger bones to come off, and weakens the skeleton generally.

Bones may be bleached by placing them in a lime-bath and exposing to the sun. I do not recommend the use of lime, as it eats the enamel of the bones. Cold water and

a hot summer's sun will bleach sufficiently, and frost will assist in winter.

Small skeletons may be cleaned by placing them in water, and removing the decomposed flesh with a stiff brush. The best way to prepare them, however, is with the help of marine animals, ants, and dermestes, as described above.

Large skeletons are generally mounted on a galvanized iron frame, articulated with brass wires. No general rule can be given which will apply to mounting all skeletons, as they vary greatly in size and form.

To mount a large skeleton of a ruminant, string the vertebræ on a metal rod running into the occipital orifice through the top of the skull. Fasten with a nut, and



FASTENING
LEG BONES.

support the whole by two upright rods connecting with the artificial spinal cord between the forelegs and hindlegs. The scapulars, leg, and other bones, must be attached in their proper positions, by drilling small holes through the bones, and connecting them in various



FASTENING
SMALL BONES.

ways. The taxidermist must use his own judgment in drilling and fastening, placing the wires where they will hold best and be the least observed.

A bow-drill is most useful in making holes, and the bits should be sharp, and taper inwards, back from the cutting edges, so that when used they will cut free and easy.

To securely fasten small bones, drill and draw them into position by a piece of polished annealed wire through the holes, turning each end with round-nosed pliers, in two or more rings, until the wire is sufficiently taken up. Wires proportionate to the size of the bones must be used. Pliers of various size to turn them are also necessary.

The joints of legs may be fastened by making a sawkerf in the middle of the extremities of each bone, to receive a strip of heavy sheet brass, with a hole in each end for the reception of pins. See illustration on the preceding page.

It is often necessary in mounting small skeletons to weave and twist very small wire about the ribs, in order to hold them in natural position. Whenever it is important to secure a bone in position, wire is generally used, except in fastening caps and very small bones, in which case cement is preferable.



CHAPTER XII.

COLLECTING BIRDS.

The experience of ornithologists usually makes them careful hunters and good shots, yet, a few remarks on collecting may be of value to amateurs, particularly if thrown among a variety of species with which they are not acquainted.

In general hunting for North American birds, No. 4 shot is heavy enough for the largest, if a gun is used that does not exceed ten pounds in weight, and No. 10 in bore. Nos. 1 and 2 shot may be used successfully for sea and lake shooting, with unusually heavy guns, built specially for such sport.

Many hunters use too small a charge of powder and too coarse shot. Muzzle-loading cylinder-bored guns will stand, and require more powder than the choke-bore breech-loaders, which are becoming so popular, particularly for trap-shooting. Before "chilled" shot were used, the choke-bores were the best for long-range shooting, with soft shot. Now nearly equal results at long-range are obtained with cylinder bores and "chilled" shot, and choke-bores and soft shot. Many trials of all kinds of guns, with various charges, have proved conclusively that cylinder-bores are the best for general shooting.

"Chilled" shot can not be used in the average thin-muzzled choke-bore gun with killing charges without "bulging" and ruining the barrels. In shooting soft shot from a choke-bore gun, they are completely jammed out of their spherical form before they leave the weapon, and although they will quickly kill a bird at short range, they soon lose force, and do not penetrate or hold together like "chilled" shot, which retains nearly its original form after being fired.

Much of the success of the collector depends on having his gun properly charged. For shooting small birds, a light gun of small bore, loaded lightly with ordinary pasteboard wads will answer. For shooting large birds at long range, a heavy 12 or 10-bored gun is best, loaded with two of Eley's pink-edge wads over the powder, and a light wad over the shot. Four or four and a half drams of powder, with an ounce and a quarter of shot, is a proper load for a solid 12-bore gun, and five and a half or six drams of powder, with an ounce and a half of shot, is a suitable charge for a heavy 10-bore gun. For general shooting with cylinder-bored guns, the ducking, or second grade powders, of medium grain, are the best. Moist powders appear to give the best "pattern," though when used in rapid firing with muzzle-loaders, miss fires are liable to occur.

The first brands of American black powder, such as Dupont's Diamond Grain, Hazard's Electric, Laflin & Rand's Orange Lightning, and the American Powder Co.'s Telegraph Sporting, are quick, dry powders, best adapted to breech-loading shot-guns. The various companies sell equal grades to the trade at about the same prices, but every collector has a favorite brand.

There are about 640 species of birds in North America, from the Mexican boundary to the Arctic Ocean, and the collector will be compelled to visit nearly every State and Territory to find them all. He will have to cruise both the Pacific and Atlantic coasts for sea-birds, scour the States on the Atlantic for many of the smaller species, camp on the barren plains of the West for the long-spurred buntings and other birds of the prairies, and climb the snow-capped peaks of the Rocky Mountains for the white-tailed ptarmigans, dusky grouse, water ouzels, etc. One often finds birds of the same genus at points thousands of miles apart.

In field collecting, birds, when first shot, should be



WATER OUZELS.

handled with great care, until the bodies stiffen, and the blood ceases to flow. When killed, they should be lifted by the legs, and the blood removed from the plumage by pressing it out with the blade of a dull knife. The blood may also be absorbed, by using fine sawdust, corn-meal, or bran.

The plumage should be well shaken and arranged, and the specimen carefully carried until camp is reached. A large-sized fish-basket, slung from the shoulder, is the best receptacle for small birds. They may be buried in fine sawdust, wrapped in sheet-wadding, or placed heads downward in paper funnels. The funnels should extend beyond the end of the tails, and so folded as to prevent the feathers from being cramped and disfigured.

Large birds are troublesome to carry. They should be hung by the legs over the shoulder, where they will be of little inconvenience, and rest quietly without chafing the plumage. Birds with a soft plumage, and long wings and tails, are the most disfigured in transportation. Others with a hard plumage, such as ducks, divers, grebes, guillemots, etc., will stand rough handling and make up well in skins.

The sexes of American birds of the same species, vary greatly in size and plumage, while others are precisely alike in plumage. With some, such as the ducks, grouse, crows, black-birds, and most of our bright-plumaged birds, the adult males are easily recognized by their large size and bright colors.

With eagles, hawks, owls, gulls, sand-pipers, plovers, snipe, woodcock, etc., the females, though nearly like the males in plumage, are much larger in size, and adults may be easily recognized.

Many species do not attain their full plumage until the third or fourth year, and nearly all sport a different dress for spring and autumn. The spring plumage of nearly all species is bright and beautiful, while, with but few ex-

ceptions, the fall dress is of a dull color. The Baltimore oriole is one of the remarkable species which appear in August with a brighter, prettier plumage than in spring. The plumage of the "young of the year," or the young male of many species, often resembles the adult females; in such instances, it is best to determinate the sex by dissection.

The generative organs are much larger during the pairing season, than at any other period of the year. The seminal glands of a warbler are as large as a pea, in spring, when late in the autumn they are no larger than a No. 8 shot. The ovaries of female birds lie in the same relative position as the generative organs of the male, and are easily recognized, though in winter a small lens will be found useful in examination. The generative organs lie close to and in the cavity of the spine, where the ribs commence. The ovaries are two in number, and one exceeds the other in size, particularly in the laying season.

Good shooting is, so to speak, a natural gift, though with practice any one can become a fair shot. In close range rifle-shooting at a stationary mark, steady nerves, a keen eye, and practice, are all that are necessary. In shooting at moving objects, however, calculation is the key to success. In ordinary rifle-shooting, a steady pressure on the trigger brings the best results, but in using the shot-gun, much snap-shooting is necessary.

There are two modes of shooting a crossing bird on the wing, viz., taking a snap-shot ahead of the bird, or covering the beak, and discharging the gun with a steady pressure while following the object. The latter is the best and surest method, though, in early practice, amateurs will shoot behind the game.

In shooting ducks and other birds of rapid flight that are fairly started on the wing, you must lead according

to the distance they may be away. A duck, going before the wind fifty yards distant, should be led from four to six feet, according to its speed. One rising from the water at forty yards, can be brought down by aiming at the end of the bill.

A driving bird, or bird flying straight from the shooter, should be well covered, and the trigger pressed when the game has disappeared under the gun barrels.

In general hunting, the collector will become accustomed to the various sounds of the forest, and any strange note or noise will quickly attract his attention. A trained



FIRE-LIGHTING OR "JACKING DUCKS."

ear will lead the hunter to birds which would otherwise be passed unseen. Many of our native birds have only their song and alarm notes. Others, such as jays, the yellow-breasted chat, and some thrushes, have a variety of notes, while a few species, such as the cedar bird, crow, and herons, have but a single cry, which is generally given in alarm. But long experience only will familiar-

ize the hunter with the notes of the hundreds of birds which frequent mountain, plain, and marsh. Nearly all our birds cease their songs when their young leave the nest. The vociferous little vireos, however, sing until they depart in the fall, and probably continue their warbling the entire year, unless it be during the moulting season.

When roaming in field or forest, follow up every strange noise until satisfied from whence it proceeds. You will in this manner become familiar with the notes of the various birds of a locality. It may require several hours, or even days, to learn a bird's note, but when once "acquired," it is seldom forgotten.

I once spent nearly half a day in a spruce swamp on a pretty little island in the Bay of Fundy, before I could find out the author of the winter wren's song. He is such a quiet little fellow when he migrates southward in winter, that it did not occur to me he could be such a sweet songster.

The little ruby-crowned wren once led me on a fruitless chase over the rugged sides of Pike's Peak, but I finally surprised one at his song later in the season on the Buffalo Mountains.

Let the collector proceed from the center of the United States, and going North, South, East, or West, he will continually meet with strange notes and new species.



CHAPTER XIII.

PREPARING BIRD SKINS FOR MOUNTING.

In removing the skin from a bird, the body should be dusted from time to time with corn-meal, or fine sawdust. This absorbs all moisture, and prevents the plumage from being soiled.

Some writers recommend the use of plaster when skinning birds. That this should be effective is an erroneous idea, inasmuch as it dries the skins so quickly that it is difficult to "return" them. If applied to the necks of some species of woodpeckers and parrots, it would be impossible to return them to their natural position. Plaster fills the pores of one's skin, chaps and cracks the hands, and, when mixed with grease in preparing fat birds, it is removed only with great difficulty from the hands. Corn-meal softens the hands, and is the best absorbent when "working on" small birds.

When preparing a skin, place the bird on its back, and run a long piece of cotton loosely down the throat with forceps, or by twisting it around the end of a wire. If the specimen be a large bird, plug the nostrils with cotton, to prevent the saliva from oozing and soiling the plumage. Break the wing-bones near the body to facilitate handling. Make a longitudinal cut from the breast-bone to the vent, and push the body away from the skin with the knife, holding the skin firmly between the thumb and fingers of the left hand, and cutting as little as possible.

When the skin has been removed far enough to expose the shins, slip them up and unjoint them at the knee, and cut through the flesh until the skin is lain bare. Flay down to the vent, cut off the extremity of the body which

holds the tail feathers, and remove the skin to the wings, cutting through them where broken. Flay to below the eyes, cut off the neck, close to the head, and remove



SKIN PROPERLY MADE.

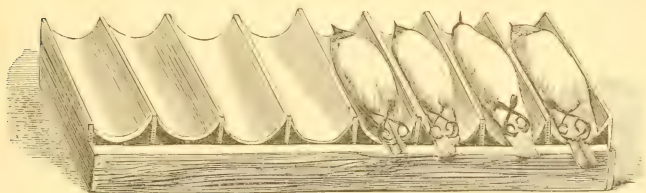
the triangular lower portion of the skull, taking out the brains. Remove the eyes, by sliding the brain-spoon under them, with a circular motion. Cut away all flesh from the skull, leg, and wing bones, unjointing the broken main bones of the wings from the double bones or fore-arms. In preparing some species of birds, with large heads and small necks, such as wood-ducks, green-wing teal, some species of woodpeckers, cockatoos, etc., it is best to open the scalp from the outside after the body has been severed from the skull and the skin returned. The incision may be made lengthwise of the head, back of the eye, or along the top of the head; the latter mode is much more desirable for birds with crests.

Pass a thread between the bones of both wings, and draw them nearly together, and tie in position. Dust the whole fleshy side of the skin freely with dry arsenic, crowd the eye-holes full of cotton, wrap the leg-bones with the same, draw them back in natural position, and return the skin. Should the neck become stretched, and difficult to return, soap will cause it to slip over the head readily.

Smooth the plumage, fill out the body with stuffing, sew up the skin, cross the legs, tie them, and wrap the skin closely, in split sheet-cotton or thin paper.

In filling out a skin, a piece of the stuffing should be made in a taper roll, and the small end pushed up into the throat of the bird. Other pieces should be laid in the body of the skin until it is full, previous to sewing it up. This will prevent the neck of a bird from drawing and drying in a long unnatural form. A drying-board will be found useful when making skins at home or in a permanent camp.

It is made by gluing beveled pieces of thin, flat wood of the same size, on a board, equal distances apart.



DRYING-BOARD.

Pieces of heavy manilla paper are fitted between the cross-boards, and glued in position so as to form semi-cylindrical gutters. In making drying-boards for large skins, tin may be used in place of paper, and tacked in position.

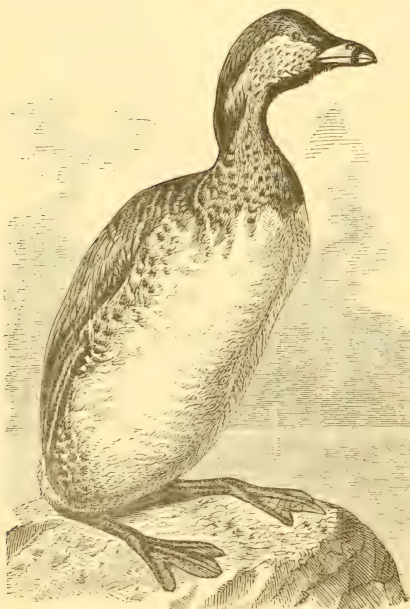
Skins prepared for scientific use, should have a small tag attached to the legs, with the sex marked on one side, and the number of the skin on the other. A duplicate number should be entered in a note-book, where data can be written for reference.

When skins are placed in a cabinet, a large label should be tied to each, giving the species, sex, locality, and date of collection.

CHAPTER XIV.

MOUNTING BIRDS WITH CLOSED WINGS.

If a bird is soiled with blood, wash the parts in cold water, and dry the plumage as much as possible with a cloth or sponge. Cover the wet feathers with calcined plaster, rubbing it lightly into the plumage until the



GREBE CORRECTLY MOUNTED.

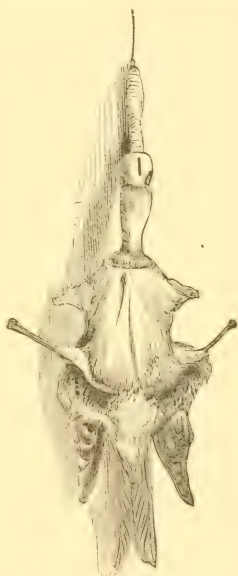
feathers are dry and assume their natural appearance. To remove the plaster from the plumage, vigorously beat the bird with the wing of a fowl or a brush-broom. Remove the body in the same manner as when preparing a skin. Roll up a small ball of tow and crowd it tightly into the skull. Wind tow around a wire, pointed at both ends, until it becomes about the length and size of

a natural neck, leaving both ends sufficiently uncovered to clinch through the skull and body. Fasten the tow with thread or string, to keep it tight and in proper form.

Pass the short end of the wire up through the tow and back of the skull, clinch firmly by repassing it through the fore part of the skull and fasten it through the eye-hole with a pair of round-nosed pliers.

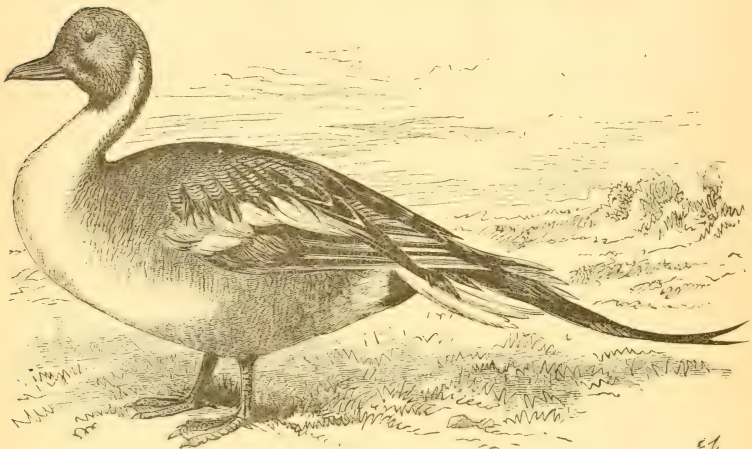
Fill out the eyes to nearly their natural size with putty or potter's clay, and dust the whole fleshy side of the skin with dry arsenic, which is best applied with the hind foot of a hare. Fat birds, and particularly large ones, should have the skin well primed with arsenical soap. Between the wings and on the shoulders of the bird-skin, are two yellowish lines where the quills of the feathers are inclined to protrude through the skin. These should be caught up with a needle and thread, and drawn nearly together, then tied in position. In a skin of a bird of the size of a red-tailed hawk, they should be tied an inch and a half apart. Other bird-skins should be drawn up in proportion to their size.

Return the leg-bones in position, and also the skin, by passing the head through the neck. Pick out the eye-lids in their natural form, with a needle or small forceps, and arrange the plumage smoothly. Make a body the shape and size of the natural one, by rolling up a bunch of excelsior, sea-grass, or tow, winding into form with twine or thread. Pass the neck-wire through the body lengthwise, pull the skin carefully over the body, and clinch the protruding neck-wire firmly. Never use skeleton or soft bodies, as they will not hold wires sufficiently tight to keep a bird in form.



SKIN READY FOR RETURNING.

Wire the legs by running pointed wires through them from the center of the feet up behind the bones. Fasten the leg-bones to the wires by wrapping them with tow and twine, making the legs a trifle smaller than they were naturally. Slip the wires further through the legs and let them pass obliquely through the body from the sides to the fore-breast. Clinch them firmly in the body,



PIN-TAIL DUCK PROPERLY MOUNTED.

straighten the legs parallel with the sides, fill out the throat and front of the breast with soft stuffing to natural size, then sew up the skin. Smooth down the plumage, bend in a natural position, and fasten to a stand.

Apply mucilage to the inside of the eyelids, press the artificial eyes tightly in position, then "pick out" the eyelids over the eyes with a needle.

With large birds, a little modelling is necessary to perfect the anatomy around the eyes. Care should be taken in arranging the eyelids naturally, as it adds greatly to the life-like appearance. Fasten the bill together, by

passing a thread through the nostrils and base of the under mandible, and tie in position.

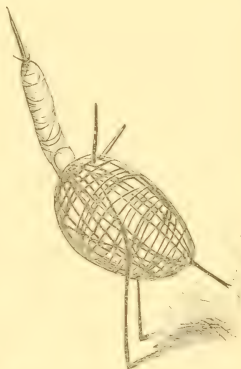
To wire the tail is one of the most delicate tasks for the tyro, and should be done as follows: Pass a long, smoothly-pointed piece of small wire through each tail feather at the flat part of the quill near the body, and spread the tail in accordance with the position of the bird. A large wire should be run through the fleshy part of the tail, from the under side, into the body, so that the tail be made to rest in any position.

Secure the wings by sticking sharp pieces of wire through them into the shoulders. Stick small, pointed wires or pins in different parts of the body, and wind the plumage lightly down in position with fine thread, and leave until dry.

The plumage may be made to lay smoother by touching the rough places with a feather wet in turpentine. When a bird is first taken, note the color of eyes, cere, gular sack, and legs, so that it can be painted naturally when mounted.

A natural crook of a tree makes an ornamental stand. To facilitate handling, small birds are usually mounted on a T stand, and removed when needed for cases. Large birds, as far as practicable, are placed on the stands they are to remain on, when first mounted.

When a bird is thoroughly dried, clip off the wrappings of thread, cut off projecting wires, and remove pins. Paint necessary parts, and varnish beak, legs, and talons, to preserve from decay and protect from the attacks of insects.



BODY AND NECK, SHOWING
POSITION OF WIRES.

CHAPTER XV.

MOUNTING BIRDS WITH SPREAD WINGS.

When a bird is to be stuffed with spread wings, it should be skinned in the usual manner, as heretofore described, but the main bones of the wings should be left attached to the double ones and not broken. To do this it is necessary to cut into the breast of the bird when skinning it, and unjoint the wings from the body. The flesh is removed from the wing-bones to the second joints from the inside of the skin. The flesh about the double bones should be removed from the outside, by making a cut over them lengthwise and on the under side of the wing. By pushing back the feathers, a large bare place will be found on most birds, where the incision can be made. When cleaning the wing, skin back carefully from both sides of the incision, and remove the flesh by pulling and cutting it out in pieces. The end of the fleshy part of the wing should be primed with corrosive sublimate, dissolved in alcohol and water. These parts are the first attacked by dermestes. Dust the wings well with dry arsenic, substitute potter's clay, firmly packed, for the removed flesh, sew up the skin by cross-stitching from the under sides, and the feathers will fall smoothly and cover the seam.

The wing-wires should be sharpened at both ends, and must be of sufficient length to clinch through the body. Run the end of the wire from the inside up the wing, between the skin and bones, and twist firmly into the fleshy tip where the primaries or first long feathers grow out. Lash the wing-bone tightly to the wire, and wind firmly with tow, then wrap securely with twine into natu-

ral shape. Smooth the plumage, lay the bird on its back, and insert artificial body. It is necessary to run the neck and wing-wires through the body at the same time,



HAWKS PROPERLY MOUNTED, WITH SPREAD WINGS.

on account of their length. The neck-wire is extended through the body lengthwise, and the wing-wires diagonally from the shoulders, and all are then clinched inside.

The leg-wires are arranged the same as described in mounting birds with closed wings, and the skin sewed up by cross-stitching. The wings should then be bent with their backs near together, and bent also at the joints to give them a natural curve. Nature is often represented by placing a stuffed bird or animal in the talons of birds of prey before they are placed on stands. This is done by running the front leg-wire through the specimen and resting it in a natural position. The ends of long wires should be stuck in the back and carried up under the wings, and doubled over the ends, to keep the quill-feathers regular and in position until dry. Strips of card-board should be pinned to the bird, to hold the plumage in position.

Birds to be suspended should have the wings raised slightly more than horizontal, and be hung by a wire run through the body from the back, and clinched in the breast. The legs of a white pigeon should have the wires cut off close to the feet, and then be bent in natural position. An eagle, hawk, or owl, may be suspended with its prey in its talons drawn closely to the body.

There can be no positive rules of detail for the last touches of this art, as a taxidermist's knowledge of anatomy and taste of arrangement will suggest the shape and position of birds.



CHAPTER XVI.

MOUNTING DRY BIRD SKINS.

To mount a large dry bird-skin well, requires experience and patience. Small skins are more easily stuffed, though they require proper and delicate treatment.

All dried skins need dampening and softening previous to mounting, and a box should be prepared for the purpose as follows: Make a tight box of tongue-grooved boards large enough to receive the skins without bending them. The cover should drop inside and rest flush with the top on cleats. The box should be filled about four inches deep with wet sand, covered with paper on which the skins are laid. The dampness from the sand is sufficient to soften humming-bird skins ready for mounting in from six to twenty-four hours, according to the size of the skin.

Larger skins, the size of warblers, should have the legs wrapped in wet cotton for a few hours when in the box. A bird the size of a robin should have the eye-holes wet, a damp piece of cotton or tow placed in the skin, and worked well up in into the neck, and the legs wrapped in wet material. When the skin has been in the box about ten hours, it is ready for mounting. Larger birds, such as herons, curlews, cranes, etc., should remain in the box with their legs in wet wrappings until they are soft enough to admit of being wired. The inside of the skins should then be dampened over night or longer, according to their size and condition. It will often take a week to get a skin soft enough to work well in mounting. The wings of large birds, which are to be spread, should be thoroughly and repeatedly dampened every night for

several days. A weak solution of carbolic acid and water should be used for moistening large skins in warm weather, as clear water will cause some parts of them to get in a semi-putrid state when soft, and the scales and skin of the legs to rub off when handled in wiring. When a skin is dampened for mounting, all stuffing should be removed with forceps, and the skull filled full with "chopped tow." A skin with a long neck should be carefully stretched with forceps preparatory to inserting the artificial neck.

A hard, smooth body should be made, and the neck attached by running the neck-wire through the body, and clinching it firmly. The depression where the neck joins the body, or where the crop would naturally be, should be filled out and rounded to the body with lappings of tow, bound in form, and held with string or thread. The neck and body should be coated with arsenical soap, to enable the skin to slip easily. The projecting neck-wire should be run through the neck out at the top of the head, and the skin worked carefully over the body until the upper end of the neck rests against the skull.

The rest of the wiring is performed in the same manner as when mounting birds in the flesh, except when "half-spreading" the wings; then the wing-wires are run in from the outside, at the first joint of the wing, along under the bones, into the body. Humming, and other small birds should have the wings, and sometimes the tails "crushed" at the base of the quill feathers when they are to be spread. This is done by pinching them lightly with a pair of flat-nosed pliers.

To perfect the anatomy of large birds, it is often necessary to make incisions in the skin under the wings, and fill out the sunken parts by crowding chopped tow between the skin and body. The cavities under the eye-holes need filling from the outside with clay or putty, before the eyes can be properly set. Previous to the final

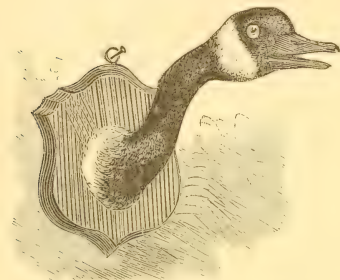
winding of a dried skin with thread, the plumage should be thoroughly steamed by holding it before the nose of a kettle. A long nose should be soldered to a common tin tea-kettle, for steaming skins.



CHAPTER XVII.

MEDALLION HEADS.

To give variety in ornamental taxidermy, heads with necks attached may be tastefully mounted in medallion effect. Heads of animals, birds, reptiles, etc., can be



MEDALLION WILD GOOSE HEAD.

prepared as described, leaving the neck-wires long enough to be passed through and clinched to a shield. The heads of birds of prey, pheasants, and the larger water birds are the most attractive. The head of the great horned owl, with ears properly erected, appears very life-like. Heads of

nearly all the duck family are effective when mounted, particularly those of the wood-duck, and hooded merganser.

When mounting heads, use as heavy a wire as can be clinched in the skull without crushing it. The artificial neck should be made a trifle larger than the natural one, and the head modelled in clay or cement. The eyes should be evenly and artistically set; the bill, cere, and gular skin, painted naturally, the color being brought out with a coat of transparent varnish.

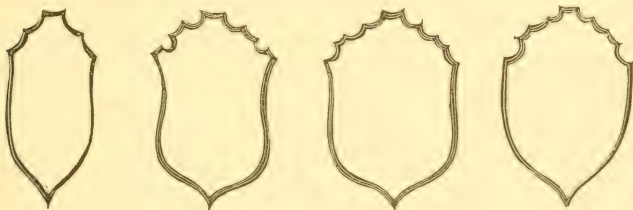


CHAPTER XVIII.

MOUNTING SPECIMENS ON SHIELDS.

To give variety in taxidermy, birds, and small animals, are often mounted as if just killed, and hung on ornamental shields. I have mounted hundreds of game birds in this manner, singly, in pairs, and in bunches. The method is seemingly pleasing to most sportsmen.

Game birds are usually placed in pairs of different species; for instance, a woodcock and snipe, a ruffed and pinnated grouse, a mallard and black duck, or two teal of different varieties. In preparing birds for shields, mount them as described, and give them the desired positions. Wires should be run through the shields and clinched in the bodies of the specimens, to hold them in position.



PATTERNS FOR SHIELDS.

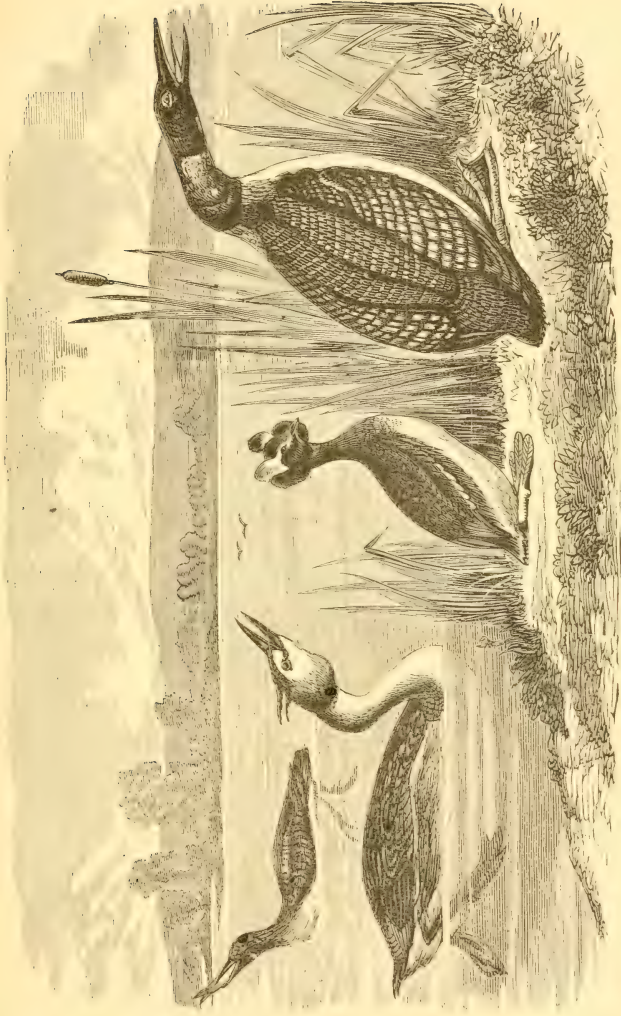
Dark-colored birds should be placed on light shields of chestnut, maple, and ash. Birds of light color present the best appearance on black walnut and stained shields.

Game may be hung up by the leg or bill, with wings closed, or with one or both wings hanging. The taxidermist will have to consider size, and exercise taste in arrangement.

The outlines of shields should be in harmony with the specimens on them, and effectively carved. The above are some of the patterns which I have made for general use.

Panels should range from three-fourths to one and a half inch in thickness. If made of thinner material, they will warp out of shape. Composition ornaments may be glued on the surface, and colored with a paste of umber and alcohol. Trimmings and chasing are done with gold-leaf, put on with gold size, which should remain several hours, until it is partially dried, before the leaf is applied. The composition and wood should be finished with a varnish of shellac and alcohol, which will dry in a few minutes. If varnish is not employed, dress off the wood with fine sand-paper and finish with linseed oil.





GROUP OF DIVERS AND GREBES.

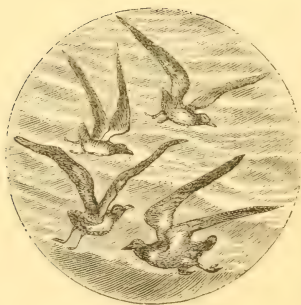
CHAPTER XIX.

DRESSING BIRD SKINS.

Varying custom has brought all kinds of skins into use, and among the prettiest are those of the divers, grebes, sea-birds, and ducks. They are made, nearly whole, into muffs, and cut into strips for trimming cloaks and hats, and for general fancy work. The most beautiful of the divers is the loon, which may easily be recognized by its perfect markings and bluish-black collar. Unfortunately, most of these hardy water birds when in their brightest plumage remain far north to breed, and upon returning late in the autumn they have lost most of their beauty. Occasionally, stragglers tarry south far into spring, and are taken in the summer plumage. The horned grebe in its rich silky dress of cinnamon-brown and silver, is the prettiest of its family, and is often sold for the Russian grebe.

In preparing these skins, they are taken off flat, as follows : Make an incision through the skin from the upper mandible over the head, between the eyes, down the back of the neck continuous to the middle of the tail. Cut off the wings and legs close to the body, and remove the skin, which comes off in mat-like form. Scrape clean, and cover the flesh side with powdered alum and saltpetre (four parts alum, one saltpetre). Fold the skin together, and allow it to remain from twenty-four hours to a week, according to its condition. If there is much fat, it will resist the action of the preservatives, and more time will be required for tanning. When the skin is permeated with the chemicals, dry and dress down with a flat piece of pumice. Soften by dressing with butter,

and finish it by rubbing freely with veneer sawdust. It is then ready for use. In manufacturing, the skins should be cut to the best advantage, lined with any stiff material by sewing, and shaped by being steamed and placed in molds, or wound down over forms until dry. A loon-skin makes a pretty ornamental rug, and can be neatly trimmed with silk or flannel. A great variety of household ornaments may be gotten up from bird skins, not only from those described, but from all of our native birds.



CHAPTER XX.

COLLECTING AND PREPARING BIRDS' EGGS.

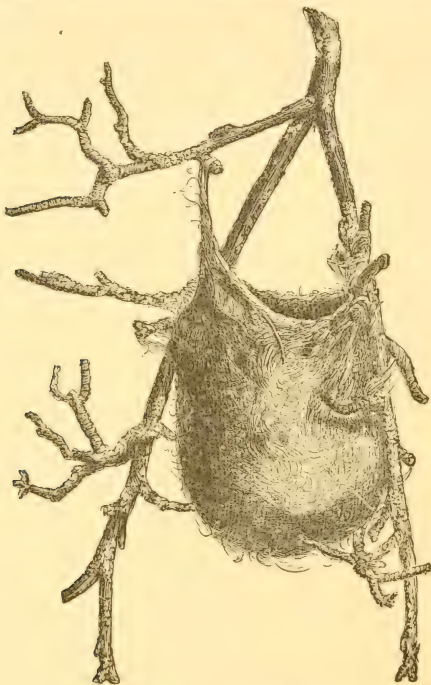
A cabinet of eggs, varying in size and color, forms one of the most interesting collections of nature. Students of oology are found in all lands, and number many enthusiastic ladies. Eggs are more difficult to procure than birds and animals, lodged as they generally are in cliffs, marshes, and tree-tops, or hidden in treacherous banks, hollow stumps, thick grass, and rushes.

To be successful, one must closely watch the movements of birds, and diligently search for their nests. Individuals of the same species often vary in their mode of nesting. The wood-duck builds its nest in a hollow tree. Other closely related species build nests on the ground. The worm-eating warbler selects terra-firma, and still other warblers build in trees and bushes. On the islands in the Bay of Fundy, herring gulls breed in trees; in other localities, the nest of this bird is found on the ground. Some species build their nests both in the trees and on the ground, such as the marsh-hawk, short-eared owl, brown thrush, swamp black-bird, Carolina dove, etc. There is one species (the cow-bunting) which never builds, but deposits its eggs in the nests of other birds much smaller than itself, such as the vireo's, sparrow's, and warbler's. I have a nest of *Vireo olivaceus* containing but one egg of the vireo and three of the large brown eggs of the cow-bunting. The shiftless bunting never assists in incubation or feeding the young, but leaves the industrious little vireo to satisfy the ravenous appetites of a family of usurpers.

Larks, waders, snipe, woodcock, quail, and grouse, make their nests on the ground. The chimney swallow lays its eggs in a skeleton nest of dead twigs, glued to-

gether with cherry-gum, on the side of a smoky chimney. It seems almost unnatural for birds to breed in such a place, and these swallows originally, doubtless, nested on the vertical sides of cliffs.

When not addled, eggs should be "blown" as soon as collected, as they are not so liable to be broken with the con-



NEST OF THE BALTIMORE ORIOLE.

tents removed. They should be carefully packed in small boxes of cotton, bran, or sawdust. If packed and carried before being blown, their weight causes them to work through the packing. In coming in contact, indentations are made, and eggs are ruined for cabinet specimens. All eggs should be blown with one circular hole in the side,

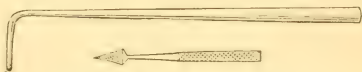
which is easily made with an egg-drill. Remove the contents with a blow-pipe, by holding the egg with the hole downward, and blowing forcibly in one side of it.

Should an egg contain an embryo, it can be removed with a small hook, or fill the shell with water, and change it frequently until the embryo has decomposed sufficiently to run off.

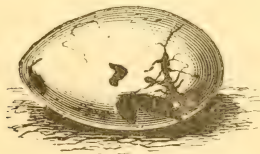
The matter in the eggs of sea-birds is very glutinous and difficult to extract. This is

specially true of the eggs of the razor-billed auk, and Arctic puffin. Immediately after being blown, the shells should be washed out first with cold water, and then with weak carbolic acid water. Ragged holes in eggs can be improved by pasting gold-beater's skin over them.

Eggs should be numbered with a lead-pencil, and the numbers duplicated in a note-book, under which should be written the date of collection, name of species, and anything else of interest. Then arrange in sets in a cabinet with drawers of various depth to accommodate them. Eggs show to the best advantage, and are less liable to be broken, when set in grated cork or colored sawdust in small boxes.



BLOW-PIPE AND EGG-DRILL.



CHAPTER XXI.

COLLECTING, PREPARING, AND PRESERVING REPTILES.

The alligator is the largest reptile of North America, and should be skinned in the same manner as a mammal, the incision in the skin being continued nearly the full length of the tail. The plated skin is obstinate and difficult to handle when mounting, but it is easily separated from the delicate white flesh. It can only be removed to the occipital bone. When the skin has been thoroughly cleared of flesh, place it in the pickle for preserving animals' skins until mounted. Or, place in a strong pickle for a few days, then remove, and partially stuffing the skin with any light material, dry it in a shaded spot. Alligators are found in the rivers and bayous of the Southern States, and still further south. The larger ones are shot with ball or buckshot while basking in the sun. The young ones can be captured with a net.

Lizards live among damp rocks, and under decayed logs, stumps, etc. They are often taken in large numbers in ponds, and creeks, and are found generally through the United States. There are many species, and most of them frequent the water. One large kind, known among hunters as the "Racer," is found only on the dusty plains of the far West.

There is not a little superstition regarding lizards, and many believe their bite causes death. The American species are harmless and really pretty. Their bodies are translucent, cold, and disagreeable to the touch, and their varying color, as they change to different objects, gives rise to much superstition. They move with remarkable celerity in warm weather, but in the autumn become inactive and are easily secured. They can be taken with



ADDER AND RATTLE-SNAKE.

the hand, or a scoop-net, and should be placed in pickle for reptiles, etc.

Snakes abound in all lands, though in the United States the species are not so widely distributed as birds and mammals. Smaller snakes can generally be handled with impunity, but the large varieties bite sharply and hold on tenaciously. All the different rattle-snakes, the moccasin-snake and adders are venomous and should be approached with great caution. All kinds are usually found coiled up basking in the sun. Black-snakes and garter-snakes frequent stone walls, piles of wood, and brush. The Eastern species of rattle-snake inhabits the loose rocks of mountains, while the large brown species of the West, frequents prairie-dog villages and gopher burrows of the plains, and the low lands between the Rocky Mountain ranges.

The larger snakes can be skinned by making a short longitudinal incision in the middle of the belly, cutting the body through, and removing it in two pieces by skinning both ways to the head and tail. The pickle for animals or reptiles will preserve the skins until mounted. Small snakes should be put in pickle for preservation, without skinning, and arranged in jars in a natural position.

Turtles are found in both fresh and salt water, though most of them are fresh water species. They can be taken with nets, or with animal bait on small, strong hooks, and preserved in pickle.

Frogs can often be caught with the hands, though they are more easily taken with dredging nets, or hooked up with a triangle of large hooks. The large ones should be skinned through the mouth to prevent making a seam, and their skins can either be preserved in pickle or dried. Small frogs are usually placed in alcoholic pickle without skinning.

Salamanders are found in fresh water ponds, and resemble large lizards. They are readily caught with nets.

and should be placed in pickle for preservation. Special jars are now made for preserving alcoholic specimens. The majority of reptiles are mounted like mammals. Snakes should have a single wire fastened in the skull, running the full length of the body. They may be held in position by wires passing through the skin, fastened to the main wire in the body.



CHAPTER XXII.

FISH, AND HOW TO MOUNT THEM.

Fish of the same species vary greatly in size and color in different waters. Those fresh water fishes which frequent brackish and dark-colored waters, have the richest colors.

The trout family is the most susceptible to the action of brackish water, which not only brightly colors the skin, but imparts a rich salmon tint to the flesh. A young trout removed from dark to clear spring water gradually loses its red underside and dark back, and both flesh and skin will assume a lighter color.

Salmon and trout should be caught with artificial flies at morning and evening during the summer. In swift waters, they readily take a baited hook; in winter, they can be caught with live bait or worms through holes cut in the ice. Pike, bass, and perch, take the revolving spoon baits when trolled, particularly in cloudy weather. Nearly all other fresh water fish can be secured by angling; lightly arranged tackle should be used.

Salt water fish are more hardy, and are often "fetched" with the rudest tackle. Blue-fish, Spanish mackerel, and bonito or "skip-jack" will take the squid as bait, while nearly all salt water species relish moss-bunkers, killies, shrimp, sand fleas, lobster, and clams.

Some kinds, such as the sturgeon, shad, and moss-bunker, can be taken with nets only. Larger fishes, not in market, such as sharks, dog-fish, skates, etc., can be caught from the deck of a yacht at anchor a few miles off the ocean coast in five or more fathoms of water. Fresh fish should be used for bait and attached to large

hooks with chains or wire, which prevent the teeth from cutting the lines.

Dog-fish are harmless, but sharks, though quite small, should be handled with care, as they quickly snap at the hand or leg, when struggling on deck.

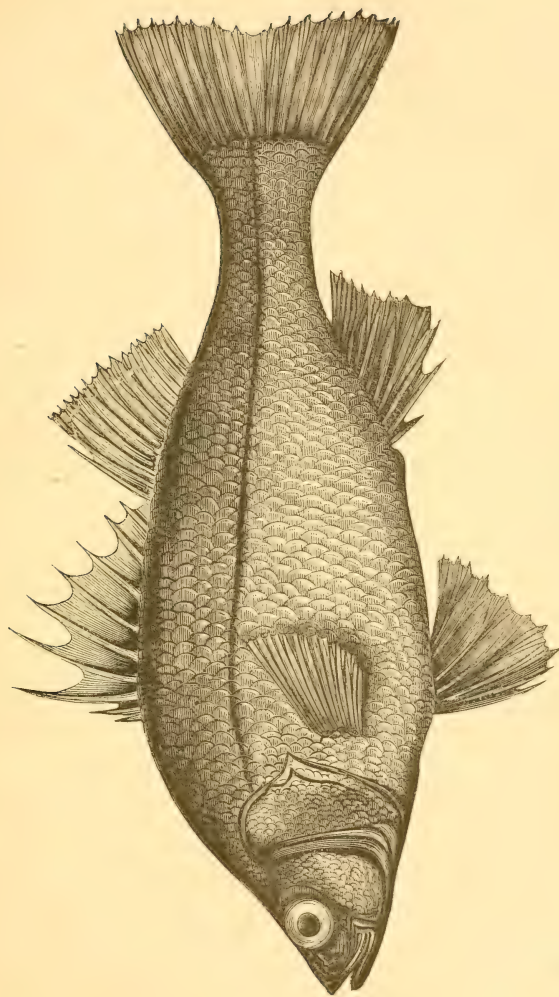
The porpoise is one of the most difficult fish to capture. With its great strength and sharp nose it makes his way through the strongest nets and can only be taken with a harpoon or gun. A heavy charge of No. 1 shot will kill one quickly as it rolls, but if not secured at once, it will sink and be mutilated by the rest of the school. Wounded porpoises are invariably hunted to death by others of their kind. They make long leaps and plow the water with tremendous speed. If a chance offers, the wounded victim will often run itself high and dry on the beach to escape the sharp teeth of pursuers, or escape over a bar into shallow water where it is easily secured.

When fish are to be mounted, they should be kept wet, so that the scales will not rise up and become loose in process of stuffing. Those taken with hooks or purse nets, are usually, if carefully handled, in the finest condition, and make the best specimens when mounted. Fish secured in trammels or gill-nets are often so disfigured as to be useless for the taxidermist's purposes.

Small fish are best prepared as specimens when preserved in alcoholic pickle, as they are too tender to be skinned and mounted. Some of the larger ones it is almost impossible to mount successfully, so delicate is their skin, and so small and thin their scales.

Pike, large trout, salmon, and the thick-skinned fishes, are the most easily handled. All species lose color when dried, and it is necessary to re-produce the natural effects by skillful painting.

In skinning, work with the fish on a piece of wet oil-cloth. The smooth surface will not injure the scales, and the moisture keeps them pliable.



A FISH PROPERLY MOUNTED.

Place the fish on the side, and make a longitudinal cut with a sharp pair of scissors in the middle of the side, large enough to admit of removing the body in two pieces. Cut the flesh carefully from the skin around the incision, and sever the body through the middle. Raise the tail portion, and skin around it to the end of the spine, severing it from the tail with a pair of crooked scissors. Skin around the remaining part of the body, severing it close to the head. Remove the gills carefully with sharp scissors, also the eyes, by slipping a small spoon under them, and making a circular motion. Cut and scrape the skin clear of flesh, and dust it thoroughly with dry arsenic. Remove all objectionable remnants, and clean the outer side of the skin with a wet cloth or sponge.

Mix clear sand and fine sawdust in about equal portions, and wet until it crumbles freely. Crowd the skin with it, laying the scales down smoothly, and preserving the anatomy of the body. When the fish is stuffed and modelled in shape, sew up the incision and set the eyes in cement or putty. Place the fish on a board, with the seam underneath, and bolster it in position with potter's clay. Pin the fins and tail in natural position with cardboard, and set away to dry. The process of drying is very slow, and the specimen should not be handled until thoroughly dried and stiffened.

When ready, sever the fastenings from the tail and fins, cut the stitches, and remove the stuffing. Place a small strip of wood in the middle of the fish with wires, projecting through the skin, to fasten it in position. If the specimen is to be suspended, two wires should come up through the back. If put in a case the wires should pass through the side; they are then concealed by the body when the specimen is fastened in natural position.

Re-stuff the skin with chopped tow or fine excelsior, packing it closely about the wood to hold it in position. Sew up the incision and glue a piece of transparent paper

over the seam. If necessary, the anatomy about the eyes should be perfected with putty or cement.

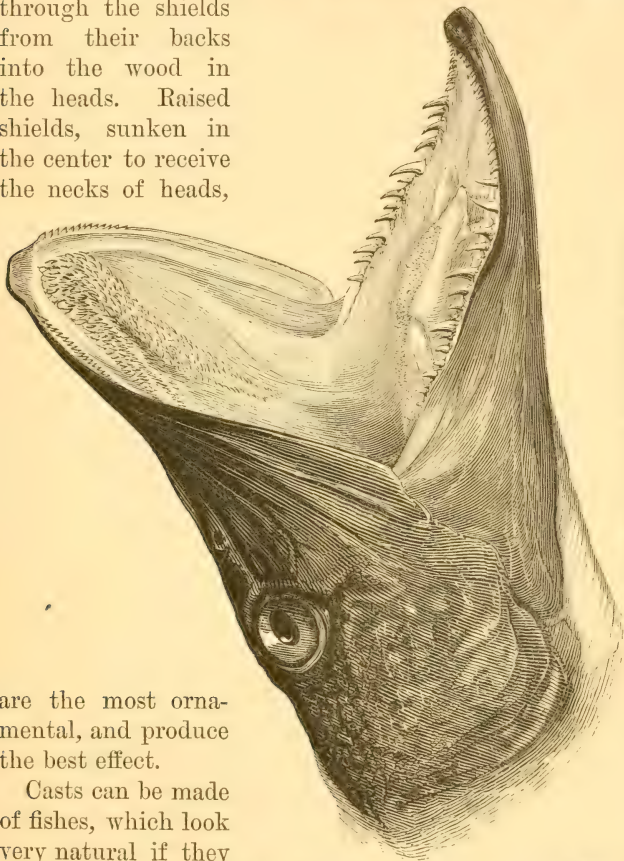
The specimen should then be painted its natural colors. When the paint is thoroughly dry, a coat of light, white, transparent varnish, will add materially to the effect.

A large fish is usually opened down the belly, and supported by two irons running from a board inside down through the skin into the stand. Irons for very large specimens should have threads cut on their ends, and be fastened to the stands with nuts and washers.

Heads of the larger species can be neatly mounted on shields. Those of muskellonge, salmon, bass, blue-fish, etc., appear more life-like when they have the mouth open, and are modelled in wax. To prepare one in this manner, cut off the head far enough behind the gills to leave a portion of the skin of the body attached; skin to the occipital, remove all superfluous flesh, and dust with arsenic. Clinch a wire in the skull from the inside, stuff it carefully, and fit a thin piece of wood to the neck-skin, tacking it in position. The neck-wire should pass through the piece of wood, and be clinched firmly. A small wire staple should be driven into the top of the neck, for facilitating the work, and suspending the specimen. Set the eyes in naturally, wedge the jaws open, raise the tongue by placing potter's clay under it; then allow the head to dry. It is necessary to remove the tongues of some of the larger species, and to substitute those made with cement or wax. The latter can be easily molded from the natural tongues.

The artificial tongues should be cast or modelled on wires with sharp ends, which can be run down firmly into the stuffing of the head, to hold them in position. The base of the tongues must be completed and connected to the head by modelling with wax and hot irons, or the anatomy perfected by modelling with cement or putty.

When dry, the whole should be colored naturally, varnished, and fastened on carved or plain shields. The heads are made secure by small screws, which are run through the shields from their backs into the wood in the heads. Raised shields, sunken in the center to receive the necks of heads,



HEAD OF MUSKELLONGE CORRECTLY MOUNTED.

are the most ornamental, and produce the best effect.

Casts can be made of fishes, which look very natural if they are properly sized and colored. To take a mold from a fish, place the latter on its side, and brace it up in a perfectly straight position with clay, covering the under half of the fish. The clay should be smoothed

down with a knife to a horizontal surface at the joints, and be closely packed to the body. The ventral fins should be laid close on the body, and the anal, caudal, and dorsal fins extended naturally on the clay. An inclosure of thin boards or clay should be raised near and around the fish, and thick plaster run over it. When set and dry, the mold should be raised, its edges neatly trimmed, and the whole coated with soap or oil, to prevent plaster from adhering. The mold should be braced with clay, with the fish in it, hollow side up, and the other half of the mold taken like the first. Have the joints of the molds made with evenness and precision, particularly about the head and fins. When the fish is removed, a funnel shaped opening should be made in the middle and from the inside of the most imperfect half of the mold, through which to pour the plaster when casting.

With a brush thinly coat the inside of the molds with castile-soap or grease, care being taken not to fill any of the small cavities. When molds are thoroughly dried, a thin coat of varnish, also well dried, is often used to make the casts come freely from the molds. Tie the molds firmly together, run them full of thin refined or dental plaster, mixed with cold water, and the fish will be naturally cast.

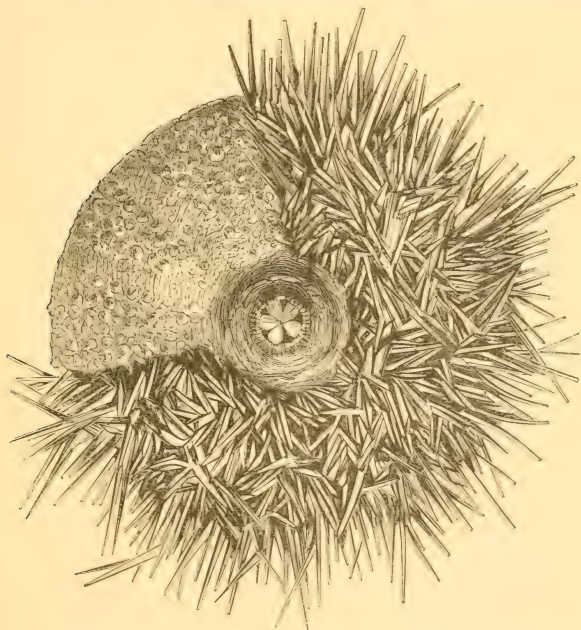
The molds should be well dried before using, and removed from the casts with care, to prevent chipping. When the cast is taken from the molds it can be fastened on a plaster stand, and any imperfections mended. The whole should then be sized with mucilage, and when well dried, painted naturally. Artificial eyes can be molded in the cast, or inserted after it is taken from the molds. If glue molds are used with plaster coverings to hold them in position, more perfect casts can be made than from plaster molds, as glue runs cleaner than plaster and its pliability admits of easy removal of the casts.

Shields of plaster, with casts of fish attached, make very attractive dining-room ornaments.

CHAPTER XXIII.

CRUSTACEANS AND OTHER MARINE ANIMALS.

In preparing the crustacea, they should be handled with care, as they are easily disfigured. Lobsters are commonly taken along the Atlantic coast, from New Jersey to Labrador. I have found them the most numerous



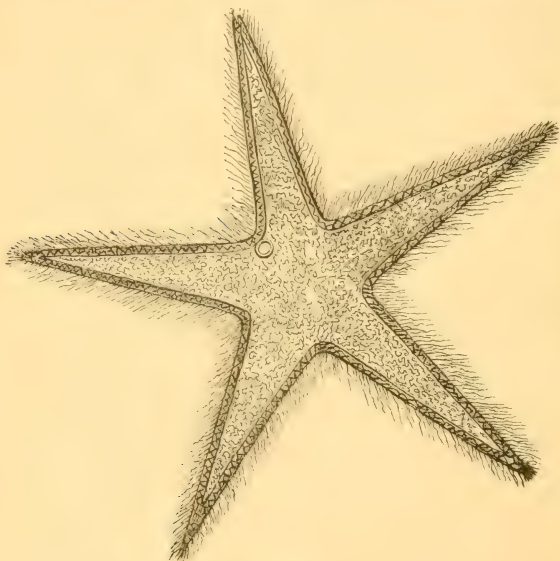
SEA-URCHIN.

about the rocky islands of the Bay of Fundy, where a boat-load can be gaffed in a few hours.

At low tide, sculpins and flounders are speared on the flats, and cut up for bait, which is deposited at low tide

in shallow water among the rocks and sea-weed. At night, the lobsters collect about the bait, and also thousands of sea-urchins. When the tide recedes, and daylight appears, the lobsters take cover under the large ribbons of kelp and the other large sea-weeds. By anchoring a boat over the bait at low water, the lobsters are searched for under the weeds and easily gaffed into the boat.

If ripples obscure the view, fish "gurry" or oil should be thrown about the boat, to give the water a placid sur-



STAR-FISH.

face. Lobsters are also taken in crates with tunnelled entrances, which are baited with fish and sunken on a rocky bottom.

Crabs may be taken in small crates, like those used for lobsters, or by dredging. They may also be caught by placing bait over light lift-nets, which must be drawn up

quickly. Baits of meat or fish let down from a boat to the ocean bottom will attract crabs. The latter will fasten on the bait, and can be drawn slowly, nearly to the surface, when they are easily "scapped" with a net.

When taken, they should be dropped into alcohol or other pickle, for if placed together, they will crush one another's shells with their powerful claws. Craw-fish and shrimps can be taken in small nets.

In mounting the larger crustaceans, cut open from underneath, and extract the flesh with scalpel, spoons, and forceps. Inject strong carbolic acid and water into the extremities, and dust the whole with dry arsenic.

Clay or cement is the best for stuffing, though tow cotton and other soft materials may be employed. When mounted, place the specimens in a natural position, and let them dry slowly. A coat of varnish will assist in giving them a glossy and natural appearance.

Mollusks are found in all waters, and upon the inland mountain sides. The conchologist will be compelled to dredge in deep water, search among the rocks and seaweeds, and even delve in the mud and sand-bars for some species.

Fresh water muscles are difficult to obtain, as they are not so numerous as the salt water species. In the spring, piles of their shells may be found where beavers, muskrats, and minks have devoured the muscles during the winter months. The minks usually mutilate these shells in opening, but the beaver and musk-rat neatly pry them apart, and perfect specimens are often found among them.

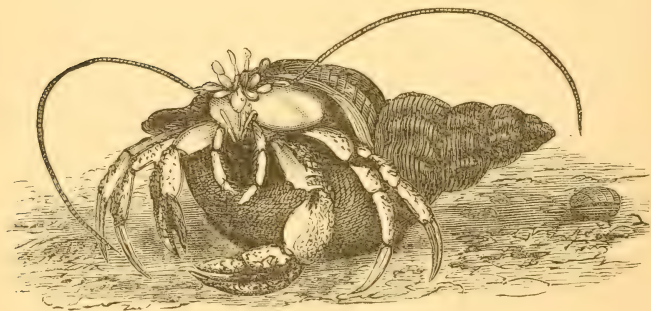
Snails are found on decayed wood, under rocks, and on plants. They prefer shade, darkness, and dampness, and immediately retire into their shells when taken in the hand and exposed to a strong light.

Large shells containing animals are generally placed in hot water, and kept there until the fleshy portions readily yield, and may be removed. While it is true that boil-

ing often modifies the color of the shell, any other process is tedious. Still specimens for cabinet use should be cleaned without boiling, and soft ones should be lightly coated with linseed or kerosene oil. Dead shells, for ornamental use, may be found on the sea-shore where the waves have cast them. The tropical coasts are the richest in shells, and most of the prettiest specimens are brought from the Eastern Hemisphere.

Star-fishes are usually found among rocks, or on sand-bars near them. They should be placed in pickle to prevent decomposition, and then arranged in position for drying. When thoroughly dried, they lose their elasticity, and become hard and stiff.

Sea-urchins may be found about baits placed in the water. They are readily gathered, and should be treated like star-fishes.



CHAPTER XXIV.

COLLECTING AND HATCHING CHRYSALIDS.—COLLECTING,
PRESERVING, MOUNTING, AND ARRANGING
MOTHS, BUTTERFLIES, AND INSECTS.

A volume could be written on the collecting, breeding, and preservation of insects, but I shall attempt to treat in detail only a few of the largest and most beautiful of the *Lepidoptera* (the butterflies and moths), or such species as can be used for ornamental purposes.

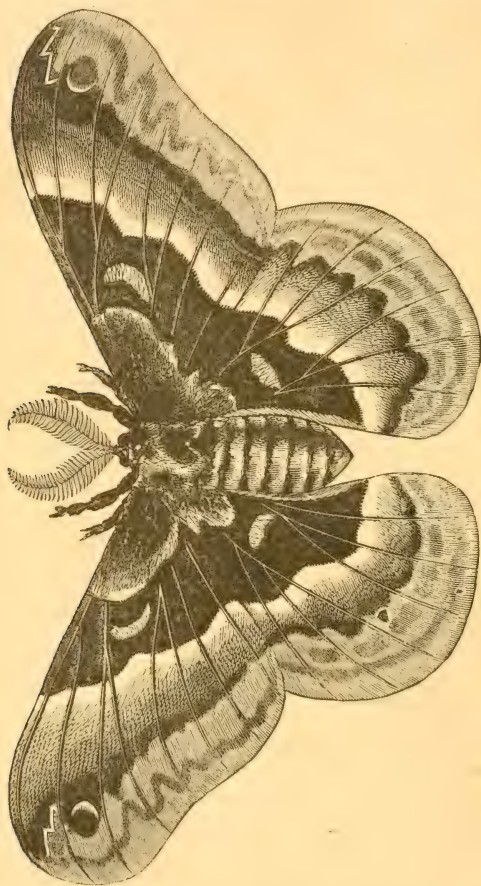
The most perfect specimens are obtained from chrysalids, which should be collected in autumn, winter, and early spring. A moth which has had its freedom one night, or a butterfly which has been on the wing for a day, cannot be called a perfect specimen.

The delicate scales which form the covering of the wings are carried away when brought in contact with other objects, though the wings may not be broken. A specimen hatched from a chrysalis in confinement, may be taken in a perfect state, and prepared within a few hours after it comes forth, or when the wings are fully stretched and dry.

The moths of the genus *Attacus* and related genera, are the largest and most beautiful of American species. The common Cecropia moth (*Attacus Cecropia*, Lin., *Platysamia* of modern authors), exceeds all others in size. This species begin to leave the chrysalids in the latter part of May, though the majority hatch in June. Those which hatch early in the day remain hanging on the chrysalids, or near them, with drooping wings, until dusk, when they fly heavily about until twilight. They are strictly nocturnal, only taking wing in daylight when disturbed.

The males scent the females for long distances, and the latter are very soon impregnated after hatching. Their

eggs are a trifle larger than a pins's head, round in shape, and have hard, white, shell-like coverings. They are deposited singly and in masses, with a glutinous liquid



PROMETHIA MOTH.

matter, which soon dries, firmly cementing the eggs. The larvæ leave the eggs in ten days' time, appearing in the form of little black, hairy caterpillars, which scatter,

and set vigorously to eating. They grow rapidly and attain their full size in about three months' time, when they go in the chrysalis state. Their food consists of the leaves of elder, spice-bush, currant, lilac, maple, gum tree, and bay-berry bush, and on these shrubs and trees their chrysalids are to be found. They are the most numerous in elder hedges, usually being found within two feet of the ground. The female chrysalis is frequently the largest, being more wrinkled, softer and fuller in form than that of the male ; both are firmly attached on their sides.

The *Promethia* moth resembles the *Cecropia* in form, but is smaller and less brilliant in color. Its habits are also like that species, though it differs in its food and form of chrysalis. The larva of the *Promethia* moth feeds principally on the wild cherry, sassafrass, and spice-bush. The chrysalids are suspended about an inch with a tough, cord-like material, which forms the upper part of the chrysalis. They hatch a little later than the *Cecropia* moths. Their scent is unusually keen, and, though nocturnal in habits, they begin their peregrinations earlier in the afternoon than the *Cecropia* species.

The *Luna* moth is the most beautiful of our species. It is easily recognized by its pale-green color, and the long, delicate, swallow-like tails to its wings. Its eggs are deposited on hickory, and other hard-wooded trees, and occasionally on currant and bay-berry bushes.

The chrysalids differ from those of the above species, being smooth, oblong, with rounded ends, and rolled in a covering of leaves. When the foliage drops from the trees, chrysalids fall to the ground, and many are destroyed by mice during winter. This is probably the cause of the *Luna* being less numerous than others. There are several other large species of beautiful moths, such as the *Polyphemus*, *Imperial*, etc., which feed on black-currant bushes, and oak, elm, and butternut trees. The larvæ of

some species of butterflies and moths make chrysalids on trees, while that of others burrow in the ground when they are about to change to perfect insects.

The large, yellow Swallow-tail (*Papilio Turnus*), weaves its chrysalids on the spice-bush, wild cherry, and sassafras trees, and they may easily be taken by amateur collectors for the chrysalids of the Promethius moth. The black Swallow-tail (*P. Asterias*), comes from a chrysalis of the parsley worm, which is very numerous, and may be gathered from most umbelliferous plants.

The best time to collect chrysalids, is in the autumn, when the foliage has left the trees. They should be kept in a cold room until hatched, as a warm room forces their development, and many insects will come out with imperfect wings. Chrysalids kept all winter in a house, will hatch nearly a month earlier than those in the fields.

Before the hatching season commences, the chrysalids should be tied singly on a strong string or wire, with the small ends upward, and strung across a room that is unoccupied. Some authors recommend screening the chrysalids in a box, with gauze, wire-netting, etc. The result would be that the moths would beat their wings to pieces endeavoring to escape, or crawl over each other when the wings are be-draggled, causing them to suffer and dry in a cramped position. They are always restless until a proper place is reached where they can hang by the legs and stretch their wings.

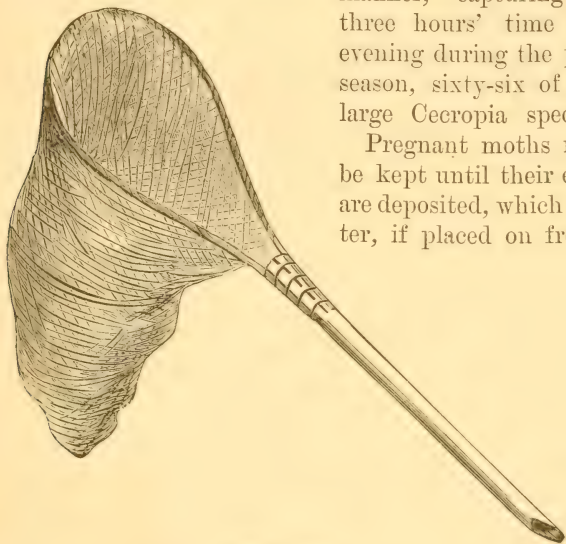
When the moths emerge from suspended chrysalids, they lower themselves to the underside of their cases and remain quiet, straining and stretching their wings, which dry in fine condition. They can generally be taken before they attempt to fly, as those that hatch early in the morning, usually lie still until evening. Should a few come out in the night and fly before morning, they soon settle with but little injury to their wings.

During the hatching season, many males can be allured

and caught, with a few females confined in a screen, or held captive by thread wound around their bodies. The males will enter the windows of a lighted dwelling, to find the females, and can be captured with a hand-net constructed of gauze or other light material. For years, I have made a practice of taking moths in this

manner, capturing in three hours' time one evening during the past season, sixty-six of the large *Cecropia* species.

Pregnant moths may be kept until their eggs are deposited, which latter, if placed on fresh,



SMALL NET.

moist leaves, will hatch, and if constantly fed with their proper food, will mature, and spin their cocoons.

A collecting-box is indispensable for shielding insects. A thin pine box, four inches deep, lined with cork, and made to open in the middle on hinges, is the most convenient. Wide-mouthed bottles with rubber stoppers, are the best for beetles. When the collecting-box is full, insects with closed wings can be placed in triangular envelopes made of writing, or any stiff paper. Nets are necessary in catching the *Lepidoptera* and other insects. Two

kinds are employed, the small net with one hand, and the large folding-net with both hands.

The former should be oval in shape. The frame-work is made by bending a piece of cane and wiring the ends

in grooves in the handle as seen in the illustration. The net proper should be firmly fastened by sewing to the frame, and be sufficiently long to fold over the lower side of the frame when it is turned.

The folding-net consists of two heavy cane bows fastened to light pine handles, working with a leather hinge secured by wiring. The net proper, should be of gauze, and not so deep in proportion as the one previously described.

The months of July and August are the best for collecting insects. Butterflies are most numerous where thistles, red clover, golden-rod, and a variety of flowers abound. Low marshy districts are most productive of insect life, and are the best resorts for collecting.

The *Coleoptera* or beetles, are principally nocturnal.

Some species live in the water during the day, and fly about at night. Others burrow and rest in the ground by day, and emerge from their hiding-places at twilight, or later. Many kinds may be taken, by placing a light at night where they will have free access to it, when they



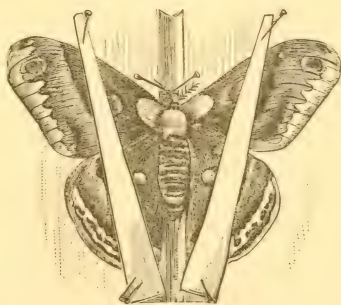
FRAME FOR LARGE FOLDING NET.

are easily captured with a small net and curved forceps. Moths and butterflies may be handled with impunity, but some beetles have a sharp bite, and should be seized with light forceps.

To preserve moths and butterflies, the larger species should have their bodies opened, poisoned, and stuffed. Bugs may simply be dropped in alcoholic pickle until mounted. Bright-colored specimens should be placed in a pickle of alcohol and glycerine.

The larger moths are very tenacious of life, and it is a difficult matter to kill them without mutilation. Diluted sulphuric, oxalic, and carbolic acid, chloroform, and spirits of ammonia, etc., are employed to kill them, but they generally struggle and beat their wings to pieces before dying. The best means of killing them, is to close the wings and tightly pinch the chest.

To preserve a moth, hold it firmly at the base of the wings, between the thumb and fore-finger of the left hand, with wings closed downward. Cut the body open with a sharp pair of fine-pointed scissors, from just above the vent to the chest. Remove the contents, prime with dry arsenic, and draw the body-skin over a form of potter's clay or roll of damp cotton. Then sew up the seam with a few stitches. While this is being done, the moth should be pinned through the chest on its side, and small forceps employed in handling the skin. The specimen is pinned from the back through the chest on a mounting-board of soft pine, grooved to receive the body. In mounting, small insect-pins should be employed, and one tem-

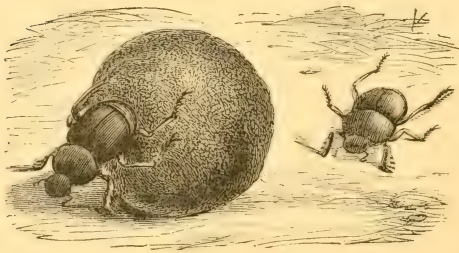


MOTH PROPERLY MOUNTED

porarily placed through each fore-wing at their front edges, near the body. The fore-wings should be set forward in position until they are firmly secured, by pinning slips of stiff paper or card over them ; then the pins in the wings may be removed. The antennæ should be raised in natural position and rest on crossed pins. See illustration.

It is labor lost to pin out the wings of insects without "coverlets," as some amateur entomologists endeavor to do. Butterflies usually retain sufficient life to struggle when being mounted, and pins in the wings generally result in ragged holes. All insects having farinaceous covering on their wings should be mounted before they become dry and stiff.

Insects are preserved in various positions. They may be mounted in cases on wax flowers, and natural grasses, or on their chrysalids, in combination on stands and brackets. They present a pleasing and novel contrast to the ever present wax flowers, leather work, splint ornaments, etc.



CHAPTER XXV.

GROUPING.

In making up large cases and shades, great care should be observed in the arrangement of specimens. In preparing a group of gallinaceous or grallatory birds on rock-work, the largest and most showy bird should be placed in the foreground in the middle of the case. The others may be mounted in various positions, and as much life thrown into them as possible.

One bird may appear to be reaching for some food overhead, another feeding on the ground, a third running for an insect, and a fourth perched quietly on a projecting rock, dressing its plumage.

The rails and many of the waders appear natural when mounted in an active position. When perching birds are arranged on a tree, a large, showy one should be chosen for a center-piece. Others may be mounted in attitudes facing the middle of the case, some with heads turned slightly forward, and others fronting.

It is not in good taste to have foreign birds arranged with native ones. Specimens of different sizes and contrasting colors should be placed effectively together.

The grouping of animals, like other arts, requires much experience and study. The taxidermist should arrange in the "mind's eye" before mounting the first mammal, then the attitude of each one can be made to harmonize with the others. Too much action can not be given to animals of prey.

A deer attacked by wolves, a panther, bear, lynxes, or a wolverene, makes a natural and showy piece. The jaguar, ocelot, and tiger-cat, when obtainable, should be employed in groups, on account of their unusual beauty.

Small groups may be made with minks, weasels, martens, fishers, hares, and large fowls; and all animals should be mounted attacking their natural prey or enemies. I have seen a New York taxidermist make the mistake of placing anacondas around roebucks and Virginia deer, and woodcock and English snipe together in the same snow scene.

Reptiles, fishes, and crustaceans should, in arranging, be grouped together in their proper genera.

Insects may be arranged in the same way for scientific use. For ornamental purposes, they can be formed into designs. Stars are easily made by commencing with large moths or butterflies, placed heads inward in a circle. These should be "shingled" with smaller ones until the points of the star are formed. Two of a species can be used in each point, and the females, being the largest, should be placed first. A tarantula or large Brazilian beetle makes a pretty center-piece, though small beetles and other insects may be used. Lettering can be neatly done with insects, particularly with the smaller moths and beetles.

Birds' eggs should be placed in sets, and the sets in families.





A GROUP OF FIELD MICE.

CHAPTER XXVI.

CARE OF SPECIMENS, CHESTS, CABINETS, CASES, AND STANDS.

First see that all objects of Natural History are properly prepared. Extremes of heat and cold, wet weather, and fatigue, will occasionally tempt the collector to neglect his work, but experience teaches him that specimens require the earliest and most thorough treatment. He will find that a skin but half poisoned is sure food for the larvæ of the *Dermestidæ*, or a breeder of pests to feed on the weak portions of a whole collection. Eggs not carefully blown and cleansed will discolor, decay, and make food for multiplying insects; and sea-shells hastily prepared become offensive, and lose color. Half pickled specimens mould and decay, and insects carelessly mounted appear cramped and ungainly. Slighted plants mould and lose color, and many specimens, procured with great labor, are often sacrificed. If a little extra trouble is necessary, there is the satisfaction of knowing that specimens, well prepared, will keep a life-time.

Poison is a good preventive of insect mutilation or destruction, but long experience has taught me that tight chests afford the best protection for specimens generally. Never place skins received from strangers among your own without closely inspecting them. Most amateur collectors do not perceive the necessity of thorough preparation. Experience, however, sooner or later sharpens their understanding.

Three kinds of boxes or chests are necessary for the protection of specimens, viz.: A field chest, a storage chest, and a chest in which natural objects may be kept for display or scientific examination.

The first should be constructed of light, strong wood, and iron bound. It should contain light wooden trays,

resting one upon the other, of sufficient size to hold the largest specimens collected, and graduated in depth to accommodate those of various sizes. For entomologists, this field chest should have thick wooden rests bored to receive various sized bottles. Two or more copper tanks may be made stationary in the bottom, with rubber bags, having valves attached, which bags may be kept sufficiently inflated to fill the tanks, and protect the specimens from swashing in transportation. Make the dimensions of a storage chest in accordance with the service required of it. Chests of several sizes, so that specimens of nearly equal bulk may be kept together, are most convenient. In this way, all space is economized, and specimens are readily handled.

The second, or storage chest, should be well made, with air-tight seams and closely fitting lids. Trays of the size required for eggs may be partitioned off in the apartments, so that specimens can be arranged in sets.

The third, or collection chest, should be made large and roomy, to the end that species can be arranged in families. The trays should have a depth to accommodate but one layer of skins. A chest with the label of the contents of each tray saves time in looking for needed specimens, and obviates unnecessary handling.

Cabinets are made to accommodate all kinds of specimens. Those for birds or eggs should be bureau-fashioned, with the extra protection of folding doors. Large, bulky specimens are rarely placed in cabinets, as they can be kept to better advantage in chests.

A commodious cabinet must be fully five feet high, three feet wide, two feet deep, and have a set of drawers with double handles, ranging in depth from one and one-half inch to four inches. The sides and top should be slightly extended, so that the doors may close "flush" over handles. The cabinet should be mounted on four wide casters. If designed for eggs, provide the drawers

with partitions, or, better still, with sets of movable paste-board boxes, partially filled with grated cork or colored sawdust. Cabinets for insects should have the drawer bottoms lined with cork, covered with paper tinted in effective colors.

Mounted specimens are usually and most tastefully mounted in shallow cases with glass fronts. Mammals, birds, and reptiles, should be mounted on plain white stands, set on shelving having skeleton metal brackets. Birds should be mounted on T and flat stands, except long-legged perchers, which may be placed on stands with inclined tops; in this manner, they appear to better advantage, and can be adjusted in natural and easy positions.

Crustaceans and insects are best arranged on the backs of shallow hanging cases, or on flat cases set on stands or tables. Eggs and shells look best on the bottoms of flat cases.

Cases for houses may be sealed with strips of pasted paper over the edges of the glass concealed under the molding. Large cases for museums and colleges should have closely-fitting doors, hung on heavy hinges.

Stands may be made in various forms. Sharp outlines should be avoided as much as possible, and the proportions of specimens carefully considered. Turned stands can be made with pretty outlines for perching birds; they are in great favor among collectors. Flat stands, for small birds, are made oval or square, the latter being slightly raised with cleats to facilitate bending and fastening of the leg-wires. In constructing all stands, see to it that they possess sufficient bottom and weight to firmly bear the specimen, otherwise the latter may, with its weight, overturn its support.

CHAPTER XXVII.

MAKING CASES.

A taxidermist, with but little effort and slight expense, can frequently make his own cases, thereby escaping any exorbitant charges of cabinet makers. Proportions should vary in accordance with the inside arrangement. For example, a case designed for grouse or any ground birds should have ample depth to allow of a sufficient surface of rocks.

If a case is to contain both ground-birds and perchers, it should be of medium depth, with a tree above the rock-work. A high, shallow case is always pleasing, particularly when standing alone.

Basswood and white pine, well seasoned, or kiln dried, make the best cases. They are usually trimmed with black-walnut moldings of two sizes. Often times a light inner molding of gilt will add to the appearance of fancy cases for bright colored birds or butterflies.

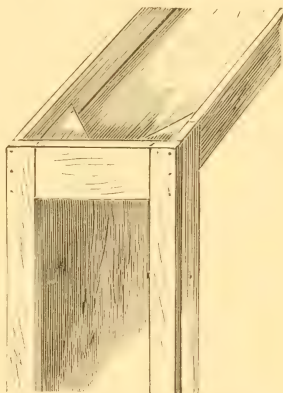
First construct the back of a case, and if two or more boards are used, the joints should be neatly made with a fore or levelling plane, and glued with the best material. To do this, nail two strips of board parallel on a level bench or board. Fasten the pieces of the back tightly together between them with long wedges. In this manner, good joints can be made with little trouble. When dry, clean the front surface with a smoothing plane, and dress well with fine sand-paper folded over a square block. The top and bottom should be made of equal dimensions, corresponding in length with the back of the case, being true to the square. They should be nailed in position on the back of the case, about the width of a molding from the ends.

Two quadrant-shaped standard strips must be nailed

at the ends between the outer corners of top and bottom. The round sides are turned inward, the flat sides being made to fit evenly with the corners of the case.

Each side should be constructed as follows: Nail one strip the width of the molding, the full length of the edge of the back. Secure a second strip with dimensions of the first, on the side of the standard piece. Between these two strips at top and bottom, fit in and nail two pieces of wood, the required thickness and width of the moldings.

The front of the case is made mechanically, like the sides, by nailing on four strips. Four triangular pieces of wood an inch thick are glued on the outside corners on the top, and in the corners under the bottom, to keep the case from warping. A shoulder, one-quarter of an inch wide, and the depth of the thickness of the glass, is made around the inner edges of the three openings of the case. This can be done with a rabbet-plane before the parts are nailed, or chiselled out, after the case is fastened together. In fastening light wood-work, finishing nails and brads



CORNER OF CASE, SHOWING
POSITION OF PARTS.

should be employed, as they hold well, and are not liable to split the material in driving. Moldings of two sizes are used on the top and bottom of the case. The outer molding may be solid or "sprung," and should be fastened from the inside of the case. The inner and smallest molding is fastened from the outside, after the glass is secured.

In the process of fitting, a sharp, clean cutting saw and miter-box will greatly assist in making close joints. The

case should be papered and tinted, the rock-work nailed in, and the side-glasses fastened by pasting strips of paper over their edges and on the wood-work. If colored paper is not used, paint it with asphalt varnish.

Grasses and mosses are then glued behind and on the upper edge of the rocks, and in the crevices, and the birds are then arranged. The front glass is now fastened in, and the case is ready for the inner molding, which can be fastened with brads or wire nails, carefully driven in holes made with a brad-awl.



CHAPTER XXVIII.

HINTS ON MAKING ROCK-WORK.

With taste and ingenuity, many varieties of rock-work can be made to closely resemble natural specimens. Different materials are necessary for each kind of rock, and, in using them, much depends on the outlines and general form. The rocks should be sharp, irregular, and built up about one-third the height of a case. A shelving one in the fore-ground, backed by an irregular rocky wall, has a natural and pleasing effect where combination of color has been closely studied. Light-colored birds should be placed on dark rocks, and "*vice versa*." All rock-work for cases should be made on a false bottom, as by this means it is readily handled, and can be completed before it is made stationary.

PEAT ROCK-WORK.

There is no better material than peat for making large rocks. That taken from fresh swamps, is the most substantial and the lightest, but ordinary marsh-peat from salt meadows will answer every purpose. It should be thoroughly soaked in fresh water to remove the salt, and well dried, as salt superinduces dampness and mould. The peat should be cut in suitable pieces, and nailed in position with pointed wires. Securely fasten the first layer, and then fasten the upper pieces by driving long wires through the whole into the wooden bottom.

When the rocks are thus roughly formed, trim them into shape with a sharp knife, and remove all loose particles with a wing of a bird or brush-broom. Give the peat and board around it a heavy coat of paste, and place pieces of cotton-wadding over the rock-work. It should be laid closely with a brush and plenty of paste. For snow scenes

and light rocks, white cotton-wadding should be employed, and the grain of the rocks imitated by "washes" of color, after the cotton is thoroughly dried. If you desire rocks of dark color, coat them with the composition referred to on page 173, and, when dry, any markings may be made with a small brush and Paris-white, or light color. If you wish water rocks, a coat of thin glue dries with a rich gloss, and gives the appearance of dampness. For grouse or any upland birds, dust the rocks before the glue dries, with pulverized rock, and colored smalts or sands. By mixing a variety of smalts, a pretty combination of colors can be obtained. When mica rock is not used, fine frosting may be sprinkled over the surface. It will impart a bright finish and a sparkling appearance to the rocks.

CORK ROCK-WORK.

The surface of cork is naturally adapted to the making of artificial rocks, and its perviousness facilitates shaping and fastening. When the cork is ready for covering, give it a thick coat of plaster of Paris, mixed with water to the consistency of cream. Then throw on pulverized rock or sand, and lightly touch with a brush of stiff bristles, in order to give a rough surface. Dry color may be put on in the same manner as the sand, until the desired shades are secured. Plaster should be thinly mixed, and left to thicken to a proper consistency, otherwise it will dry so rapidly that sand will not adhere firmly, and the plaster will come off in scales. Plaster should always be quickly handled and allowed to thoroughly dry before it is touched.

Nature can be more faithfully represented by this rock-work than by any other variety.

COKE ROCK-WORK.

Coke is generally placed at the bottom of large rocks or at the base of trees, in hanging shades. It can be covered

like the other rock-work described, but in shades it should be dressed with glue and grated cork, and colored with paste and dry colors. The coke can be fastened by filing a flat surface and gluing it in position.

BRONZED ROCK-WORK.

Nearly all varieties of artificial rocks can be bronzed, though the following is the best method to pursue. Form the rocks of cork and coat them with plaster, care being taken to fill all crevices. When dry, cover with a sizing of thin glue, and color, and when the latter is also dry, cover with thin, white varnish, working in bronze powder with a brush. Bronzes in powder of all colors can be procured at paint stores.

PAPIER-MACHE ROCK-WORK.

This material may be modelled over a body of any kind that is first coated with glue. While it can be finished with any dressing, it takes bronze the best.

FANCY ROCK-WORK.

Bright-colored rocks can be made in various ways; the following is the most successful: Construct a body of cork, as directed, or of thick pine bark. Cover with thin hot glue, and dust quickly with grated cork, prepared with a common tin grater. When dry, put on dry colors with a brush and paste. A dark ground should first be made with umber or lamp-black, then lighter colors added, and the whole very faintly tinged with orange chrome, rose, and vermilion. Fancy rock-work should only be used with birds of bright plumage.

CHAPTER XXIX.

PAPERING AND TINTING CASES.

The surface to be papered, must be dressed with sand-paper folded over a flat piece of board or cork. Any unevenness in the wood is thus corrected. It is essential that the surface be even, otherwise the coloring will set in clouds, and the effect be lost.

Select good quality of white paper without gloss finish, and cut it in the required dimensions. Give the wood a liberal coat of paste well worked in. Paste one side of the paper, and attach it evenly to the top of the case. The case should lean slightly forward, so that the paper will hang clear. Lay the paper with a fine brush-broom or clothes-brush, and smooth with the hand. If any blisters appear, perforate them with a pin, so that the air may escape from underneath. The backs of oval and square shades may be papered and colored with pleasing effect.

In papering circular wood backs of hanging shades, the moisture often causes the wood to warp. The backs can be brought back in shape by wetting the hollow side of the back.

The appearance of cases may be greatly improved by using warmly-colored tints in the back-ground. For a case of eggs, insects, crustaceans, shells, ferns, or flowers, a pale blue is effective.

A case containing rock-work with trees, animals, or birds, should be tinted in several colors. A sunset effect can be produced by arranging blue at the top, yellow in the middle, vermilion at the bottom, and carefully blending these colors. The paper should be thoroughly dried before tinting. The colors should all be mixed at the same time in separate vessels, so that they can be blended.

The top of a case should be of uniform color, pale-blue being generally most effective. Kalsomine, thinly mixed, should be used, and must be well distributed. A flat brush produces the smoothest surface.

Ordinary work can be done with a brush of fine bristles, but one of camel's hair is preferable. If a heavy brush is employed, the kalsomine should be made thicker.

ARTIFICIAL TREES.

Artificial trees are preferable to natural ones, as they can be bent into any shape, and will accommodate all positions of birds. The wires upon which they are made, keep them firmly in place, and they are generally adopted by modern taxidermists.

THE COTTON TREE.

The tree is made by winding strips of cotton-wadding, wet with flour paste, around wires. The wadding should be torn in strips of a convenient width, and the strips are then split. One end of the wire should be bent and turned like a crank with the right hand, while the cotton and other end of the wire is held between the thumb and fingers of the left. By this means the wire is easily covered with the cotton. If the latter should become dry, wet the fingers with paste, from time to time.

For making large trees, several sized wires are necessary. Two large pieces should be covered with cotton for a few inches, and the wire below twisted together for the center of the tree.

The cotton should then be put on, from the fork, down the two wires a short distance, and another limb added and twisted. Additional limbs, increased in size, should be added, until form is completed. Leave to dry, then bend the tree in position and give a coat of thin sizing of glue. When this is dry, another coat is necessary; after

which, cover with dried moss rubbed fine. When dry, artificial leaves are wired on, and the tree is complete.

PAPER TREES.

These are made thick and stocky, and are mainly used for large birds. The body of the tree is constructed by twisting excelsior, sea-grass, or tow, around a large wire, which, if glued, will facilitate the work. It is then wound firmly in shape with string. Give the tree a coat of paste containing considerable glue, and wrap it closely with strips of soft paper, which, when on, should be well laid with paste. As soon as dry, apply a coat of glue sizing, and, when it hardens, cover again with glue, and dress with grated cork. This coating having dried, color with a mixture of lamp-black and paste; after this becomes set, shade it with paste and dry colors. A variety of mosses may then be glued on.

PAPIER-MACHE TREE.

The body of this tree should be formed in the manner described for paper trees, and the surface covered with the paper composition and modelled in shape. The papier-maché tree can be made to look very natural, and peculiar knots or kinds of bark can be closely imitated. Stumps may be made and bronzed, colored, or mossed. In constructing all kinds of trees, wires should be left projecting, of sufficient length to go through holes in cases, and be clinched. Add artificial leaves.

SNOW SCENES.

Shades, with snow scenes, are the prettiest and most natural work the taxidermist prepares.

A winter scene should be made with overhanging rocks to give a natural effect. The under side of the rock-work should represent stone, and the upper parts, where





the snow would naturally fall, should be covered with white cotton, and dressed with artificial snow and frosting, thrown on wet plaster.

The whole rock-work is covered with white cotton-wadding, the under parts being painted to imitate any rock-work described. Dark birds should be used, such as California quail, spruce grouse, and plumed partridges, though any species of grouse look well. The rock-work should be made to correspond with the positions of the birds, so that a group will not appear crowded. The wire in the birds' legs should be left long and pointed, that they may be pushed deep into the rocks, and hold the birds securely in position. The whole should then be trimmed with dried grasses and weeds; these are dipped in very thin plaster, and covered with burnt alum and frosting. They should not be used until dry, and the beauty of the shade depends much on the manner in which the grasses are arranged.

With a brad-awl, holes can be made in the rocks and at their base, in which to securely plant the grasses. All irregular pieces which may interfere with the birds should be cut off, and the whole covered with a well-cleaned shade when dry. A piece of scarlet chenille placed around the bottom of the shade makes it complete.



CHAPTER XXX.

MODELLING, CASTING, AND CARVING.

Success in reproducing objects of plastic materials by carving and pressure is acquired only with long practice. Modelling in itself is an art well worthy the study of taxidermists, and those who become proficient will find it a great aid, not only in mounting specimens, but in the arrangement of rocks, stumps, etc., in the general make-up of cases.

In mounting specimens, plaster, clay, composition, putty, and wax, are the materials employed in perfecting the anatomy. Plaster is the best for heavy work in modelling solid heads or over skulls. It is frequently used in forming the limbs of animals, but unless it has sufficient thickness to give strength, it should be mixed with glue, to prevent cracking. It may be used in the formation of rocks, crosses, and various ornaments, being richly colored with Chinese vermilion. In mixing plaster, add a little salt to the water, as it will harden it. Be particular to do this where nails are to be driven. In mixing plaster, it should be prepared with clean water, to the consistency of cream, when it will soon become hard enough to work. If made too thick, it becomes hard before it can be handled, and cracks when thoroughly dried.

Plaster, which is air-slacked or mixed with dirty water, is useless, as it will not set, and crumbles in working.

Skulls which are to be modelled over should be all cleaned and dried; otherwise the plaster, which is very absorbent, will soak up the grease and prevent it from setting. Iron fastenings should not be used in plaster, unless covered with other material, as the rust quickly penetrates to the surface and disfigures the cast.

Clay is useful when modelling under the skin, or for making rough patterns to cast from. It is mixed with pure water for heavy work ; a little glue is added for light modelling. It works clean and smoothly, though it quickly dries, and requires to be frequently moistened in working. It retains but little strength without glue, is liable to shrink and crack, and has not the firmness of plaster.

The composition described is firm, does not shrink, and is very strong when dry. It takes paint well and does not peel like wood-work. When used it should be steamed. It is very pliable and pieces may be glued in any position. It dries slowly, though, when cold, a slight pressure will not cause indentation.

The nature of putty is well known. It is used for fine work, such as modelling eyelids to the eyes, filling shot-holes in the legs and beaks of birds, setting small eyes, filling checks in wood-work, etc. That manufactured for glaziers does not contain sufficient white lead for the taxidermist's use. Pure lead, ground in oil, should be thickened with whiting until it has the proper consistency. It can be made the required shade by mixing in colors, or it may be painted when dry. If painted when wet, the smooth surface will not take the color, and the moist putty absorbs the oil of the paint, causing the body of it to peel.

Wax is the best material for fine work, and is almost indispensable for some kinds of modelling. It can be used where other materials would shrink and disfigure the work. It is mostly employed for the combs and wattles of fowls, and for finishing the open mouths of mammals and large birds. It can be modelled with edged tools or seared into form.

Casting requires but little skill when molds are to be had, but if they are to be made, the work at once becomes difficult, and angles must be closely studied. The

secret of successful casting is in making the joints of the molds at the proper places, and at correct angles, so that they can be removed without the interference of shoulders on the cast. In taxidermic casting, tin, plaster, wax, and glue are used ; and in modelling, clay, plaster, composition, putty, and wax.

In making but a single cast, particularly from flesh, a full-jointed mold is not necessary. The object may be braced in position with clay, and covered with plaster, which should be thinly mixed, and allowed to thicken before it is placed about the form. The plaster should be carefully run or pushed under the object, and slowly "built" upon, until the whole is covered. Owing to the inconvenient shape of some objects, they require to be turned over to complete covering. When the plaster has "set" hard and dry, saw the mold in two or more pieces, and remove the contents. In casting, grease the joints and insides of molds ; tie together, and run them full of plaster. If the sections of the molds do not part from the cast when dry, chip them off in pieces, and if there be any imperfections on the cast, restore them by modelling.

In preparing molds for regular casting, it is necessary to construct a single section at a time, making holes and buttons in the joints to prevent the sections from slipping out of position. Molds of plaster are generally used for this kind of work. Though it is not generally known, glue molds, having plaster covers, can be used with fewer joints, and with less inconvenience. Thin plaster runs closely to glue-molds, which can be stripped repeatedly from casts, without regard to shoulders and angles.

Tin is run in molds of plaster in making teeth and the connecting parts of the crania. The molds should be warmed and well smoked to insure a good solid casting.

Plaster can be run in molds of metal, plaster, composition, glue, wax, and wood. The sections must be correctly jointed, however, or the cast will be broken in removing.

Hot wax works well in molds of metal, plaster, and wood. It can be shaded by mixing colors with it when warm, or working them in on the surface. Casting of all kinds should not be hurried. Molds should be thoroughly dried before being used, and casts must be "set" hard when removed.

Carving can often be done to advantage by the taxidermist, though it is generally better and cheaper for him to employ skilled workmen. Many ornamental designs can be bought cheap, and glued or nailed on shields and cases. It is well, however, to have a set of carver's tools for jobbing work, in making wooden skulls, tongues, teeth, etc. Carving tools should be purchased, though many convenient instruments for modelling and general work, are easily made by one's self. I have constructed at least one-third of my own tools, and find them better adapted to my purpose, than any I could purchase.



CHAPTER XXXI.

USEFUL ORNAMENTS FROM ANTLERS AND FEET.

The horns of all animals can be used in a great variety of ways in ornamental work. The value of antlers depends much on the regularity of their prongs, which gives them a convenient shape.

Elk and mule-deer have the most even horns, though those of the Virginia deer are the prettiest in color and surface. The heavy palmate horns of the moose are often found with great regularity, and, when well curved, make substantial racks for guns, clothing, etc.

The thin, long, light palmated antlers of the caribou are usually inconvenient in shape, and are used chiefly as ornaments. Antlers of the white-tailed deer are often regular and very pretty in appearance, though there is not a species in the genus *Cervus* which bears antlers of such varying forms as the Virginia deer. In my collection of over one hundred pairs of antlers of this species, there are scarcely two pairs that are at all alike.

Large horns "make up" best in hat or gun-racks. They should be mounted in accordance with the place they are designed to occupy, the matter of space being closely studied. When room is limited, they should be mounted as flat as possible on a stout, wide shield, hung with two screw-hooks, to prevent turning when the weight is uneven. Standard racks of walnut, with one or more pairs of antlers tastefully attached, make popular ornaments for large halls. The large antlers are generally placed at the bottom, and all are firmly mounted on a carved middle standard piece. The tips of elk and deer

antlers are often so sharp as to injure clothing. For convenience and ornamentation, they may be tipped with metal buttons plated in nickel, silver, or gold.

For gun-racks, elk antlers are of most convenient size, and the average pair of large horns will accommodate four guns placed separately on the tines. Some are almost too wide at the tips to hold a gun of ordinary length. I have within a few weeks' time mounted fourteen unusually large heads, the antlers of the smallest being 4 feet 2 inches long, with a spread of 3 feet 1 inch.

In mounting all large antlers for racks, place them so that the tines will have the most convenient angles, and fasten them strongly on heavy wood-work by bolting or screwing through the thick part of the skull. The skull can be concealed as described in a previous chapter.

Attractive stools and chairs can be made from deer antlers. If selected with convenient form, they work together with pleasing effect. Two pairs of horns, having metal shoes, turned with backs together, and burrs upward, make a pretty stool if covered with a fancy walnut or veneered seat, or if plainly "seated," and neatly upholstered. Convenient arm chairs may be made from antlers alone, by separating and tastefully placing them together. The butts of broken antlers are good for handles of umbrellas, canes, whips, knives, etc., and the tips for pegs and wall hooks. They are likewise useful for splicing ropes, and their solidity makes them valuable for manufacturing purposes.

The feet and legs of nearly all ruminants can be utilized in various ways. In preparing them, make a cut down the back of the leg to the cleft of the foot, carefully skin to the hoofs, and poison well with arsenical soap. Sew up the skin about the bone, from the under side, by cross-stitching, picking out the hair as you proceed to cover the stitches. Bend in the required shape, and the limb will dry stiff and firm. Large legs of elk, buffalo,

and cattle, are often used for legs and arms of furniture. Usually, for heavy work, the bones are removed, and the skin is closed over wood-work. Small feet can be used for handles, bent or straight, for various articles. In all such work, the hoofs should be highly polished and shoed with metal.



CHAPTER XXXII.

RECIPES.

Composition for Snow Scenes and White Crosses.—Crush burnt alum with a roller, and remove small lumps. Add frosting, which should be rubbed through a fine sieve with a piece of cork, or be pulverized by pounding.

Composition for Making Tongues—Modelling the Inside of Animals' Mouths ; their Muscles, Legs, Feet, etc., and for General Fancy Work.—Procure 3 lbs. white glue, 1 pint raw linseed oil, 1 pound resin. Heat the oil and resin, then add hot glue, and stir thoroughly. Thicken with Paris white until the mixture has the proper consistency to mold when warm. This composition soon dries, becomes very hard, and can be colored or gilded. Fancy decorations of any design can readily be made from molds of plaster or wood, and be glued on to shields and cases, thereby saving the expense of carving. The above is my own composition, which I have successfully employed for many years.

Plaster Cement.—This cement is very useful in modelling the heads and legs of large animals. It should be worked as quickly as possible. It is made by uniting plaster of Paris with thin glue, until the mixture is thick enough for modelling.

Composition for Sanding Rocks, Stands, etc.—Dissolve half a pound of glue in 3 pints of warm water ; stir in a pound each of Venetian red and yellow ochre, together with half a pound of lamp-black. Add a little flour paste, and boil. This makes a sombre brown, but other colors can be blended to produce a variety of effects.

Arsenical Soap.—Dissolve 1 pound of finely cut laundry

soap in 2 quarts of warm water. Add 3 pounds of arsenic, 1 ounce of fine corrosive sublimate, a lump of potash the size of a walnut, and thicken with pipe-clay, to give the preparation body. Heat, and stir well when cooling to prevent the arsenic from settling.

Pickle for Preserving Animal Skins.—Mix 2 pounds of salt, 1 pound of alum, 2 ounces of saltpetre, 1 ounce of corrosive sublimate, $\frac{1}{4}$ ounce of carbolic acid, in two gallons of cold water. The acid may be omitted in cool weather. When the flesh side of the skins begin to get slimy, the pickle should be renewed or strengthened.

Pickle for Preserving Crustaceans, Reptiles, and Fishes.—Place specimens in air-tight jars or tanks in liquid, composed of two parts alcohol, one part glycerine, and one part water.

Pickle for Beetles and Other Insects.—Mix 2 ounces of water, 2 ounces of alcohol, $\frac{1}{8}$ ounce of corrosive sublimate. The corrosive sublimate is not necessary unless the specimens are to be mounted and exposed, in which case it prevents the attacks of dermestes and other insects.

Kalsomine for Tinting Cases.—Mix three parts of Paris white and one part of powdered magnesia with glue water. Stir in a little dry color, until the desired shades are obtained, and thin with cold water. Chinese vermilion, chrome yellow, and ultramarine have the best effect.

To Prepare Glue.—Soak the glue in cold water until soft and pliable. Pour off water, and melt the glue, placing the vessel in another containing water, and heat. It will then be of the proper thickness for use. For molds, the best white glue should be used, being as thick as it will pour when hot.

To Prepare Paste.—Make a soft dough of flour and

cold water, stirring until the lumps disappear. Add glue soaked in cold water, and stir the mixture until it begins to boil. Remove from the fire, and use when cold.

To Make Papier-Maché.—Soak any soft paper in warm water until it becomes a pulp, add glue, and shade it by mixing dry colors. Boil well, and it is then ready for use.

To Clean Glass and Shades.—Rub with a piece of chamois-skin dipped in wet Paris white. When dry, clean with crushed damp paper, and polish with dry paper or a clean chamois-skin.





ORNITHOLOGICAL PARTS OF A BIRD.

- | | |
|---|--|
| 1. Upper Mandible. | 22. The Breast. |
| 2. Lower Mandible. | 23. The Neck above, or Upper Neck. |
| 3. Nostrils. | 24. The Back, or Mantle. |
| 4. Ridge, or Culmen. | 25. Scapular Wing-covers. |
| 5. Commissure, or cutting edges of the Mandibles. | 26. Lower Back, or Tergum. |
| 6. Apex, or point of the Beak. | 27. The Shoulder. |
| 7. The Chin. | 28. Body, or Lower Breast. |
| 8. Upper Throat | 29. The Belly. |
| 9. Keel, or Gonyx. | 30. The Vent. |
| 10, 11. Colored Bands, usually called
Bridles and Stripes. | 31. The Tail Feathers. |
| 12. The Forehead. | 32. The Under Tail-covers. |
| 13. The Gape, or Rictus. | 33. Spurious Quills. |
| 14. Space around the Eye. | 34. Secondary Quills, or Secondaries. |
| 15. Lower Throat. | 35. Primary Quills, or Primaries. |
| 16. Superciliary Region. | 36. The Shoulder Margin. |
| 17. Crown, Summit, or Vertex. | 37. Wing-covers. |
| 18. Hind Head, or Occipital Region. | 38. Under-surface, or Under-part of
the Body. |
| 19. The Nape, or Nucha. | 39. The Tarsus, or Leg. |
| 20. The Ear, or Ear-Feathers. | 40. The Front Toes. |
| 21. The Throat. | 41. The Hinder Toe, or Hallux. |
| | 42. Upper Tail-covers. |

HOME DECORATION.

CHAPTER I.

DECORATING WITH NATURAL OBJECTS.

Very many things about us can be utilized for ornamental purposes. Nature provides an inexhaustible



BIRD NEST BRACKET.

amount of material, and artistic taste can devise, and skillful fingers fashion, a thousand-and-one designs.

Trees contribute their bark, twigs, leaves, and seed vessels ; meadows, their ripe grasses and dry flowers ; rocks,

their lichens and mosses ; the woods their insects ; the birds their fairy nests, and the ocean its shells. A fungus-bracket over the piano, or group of stuffed birds under the statue in the corner, or an arch of ferns and berries over the folding-door, give an air of culture and refinement to a home, however humble it may be.

The illustration on page 177 represents a bird-nest bracket artificially mounted with pleasing effect. The nest is a yellow warbler's, though any pretty nest can be used. The pensile nest of the little vireo forms a pleasing contrast to those of other birds.

In making the bracket, cut, from stiff paper, a pattern of a shield. From this pattern, fashion a thin shield of wood, and nail on a tasteful branch. Sand the shield as described in directions for rock-work, and place a hook at the top. Then glue the nest in place, and likewise attach moss, ferns, and grasses. If a large nest is used, a small piece of rock-work may be placed at the base of the branch.



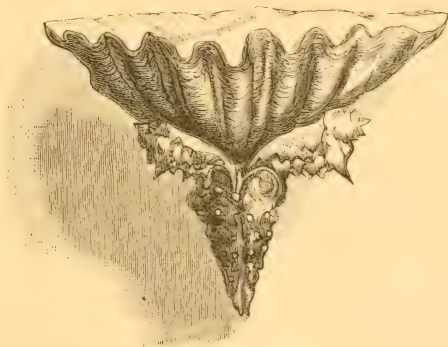
NAUTILUS VASE.

The Nautilus shell, seen so often in the formally labelled rows of shells in cabinets, assumes a new grace and

beauty when converted into a vase. Use shells or a starfish for the base. From the center, erect a stick, or support, eight or more inches long. Thickly coat the latter with rough plaster, and stud the plaster, before it dries, with small shells. Rest the Nautilus, forming the bowl, upon the stick, securely fastening it with moist

plaster. If bits of plaster should be visible, small shells can be attached, or powdered rock thrown on here and there. The Nautilus, if properly adjusted, will hold water, and in summer can be used for cut flowers. In winter it presents an attractive sight, filled with ferns, grasses, and dried flowers, and having vines of the climbing fern trailing from bowl to base. Some employ the polished and carved Nautilus ; although the pearly lustre is brought out in these, I prefer the natural shell with its beautiful markings.

Other large shells can be used in this way, as originality may devise, or taste suggest. Three Scallop shells make a pretty outlined and secure base for a small vase ;



SHELL BRACKET.

their beautiful colors may be brought out by dipping them for a few minutes in muriatic acid, two-thirds diluted with hot water.

Shell-brackets can be made in various effective styles. They should have wooden backs slightly smaller than the outlines of the back of shell. Drive a few nails into the latter with projecting heads. Cover the back with thick plaster, into which, quickly set shells, as desired.

Beautiful Easter crosses can be formed of shells. The

cross should be fashioned of slender pieces of wood, covered with thick plaster, and resting on a base of rock-work. Attach shells to the cross before the plaster sets. Several medium sized bowl-shaped or pear-shaped shells can be attached to the cross piece. These shells can be filled with water, flowers, and green vines, which will remain fresh during Easter time.

Many light-colored shells can be used in combination



HALIOTIS BRACKET.

with grasses, ferns, leaves, and mosses, the polished varieties being most effective. The beautiful inside of some species may be exposed, and their rough outsides concealed, by careful arrangement of other matter. The Haliotis is highly colored, and may be fashioned into an attractive bracket.

To make a bracket like the one illustrated, cut out a back of heavy pasteboard or thin wood. Glue the grasses on the back in position, lay the shell over the bottom of them, and fasten with glue, plaster, or wire. Glue a

few mosses about the upper edge of the shell, into which fasten with glue, light sprays of fancy grasses. A group of small shells may be used for a base, instead of a large single shell, as the latter is sometimes difficult to obtain.

Small brackets may be artistically made, of ferns, grasses, leaves, mosses, etc., and set off with moths, butterflies, dragon-flies, beetles, and other insects. The larger



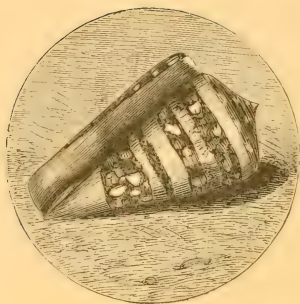
MOTH BRACKET.

moths and butterflies are the most showy, and many species have a great variety of color.

Insects may be used in ornamenting baskets, bouquets, wreaths, drapery, or any ornament of natural materials. The bracket illustrated is made from a fungus, ornamented with ferns and grasses. The Luna and Cecropia moths are attached to their cocoons.

The moths should be hung with drooping wings in the

position they take when first stretching their wings after issuing forth. When fastening moths, warm glue should be placed on the legs, and the pins running through the bodies inserted in soft material until the legs touch the material; the glue will set and hold them securely in position.



CHAPTER II.

FERNs.

In almost any shaded woodland, ferns wave their graceful plumes, and no design or pattern of tapestry ever imitated one-half the beauty of their delicate outlines. The little ball unfolds itself as if by magic, and a fairy-like leaf of light-green appears. Moist earth and summer heat make larger fronds and deeper green; autumn turns some a sober brown, and winter frosts often bleach them to snowy whiteness, as if to end in purity a growth so beautiful. Taste and skill in decoration, add to the beauty of ferns, but the most careless grouping or indifferent handling cannot destroy their exquisite beauty of form or grace of outline.

They are abundant in the loamy soil of shaded wood-lands,



FERNs AND FERN-LIKE LEAF.

and in rocky nooks of shady mountains. Their growth varies in different localities, but ordinarily, they should not be collected until July, and later. They are in best condition for pressing, when nearly full grown ; when very young, they are full of sap, and after thorough



FERNS ON FUNGUS BRACKET.

pressing and drying, are too fragile to handle. When collecting ferns, a large book or file of papers should be carried to the woods ; but if this should not be convenient, they will keep in a basket if sprinkled and closely covered. When first taken, they should be laid flat, and pressed as soon as possible : for very large specimens, sheets of blot-

ting-paper and botanist's heavy drying paper are desirable.

Too many should not be placed together, or over-lap. They should be evenly distributed through a pack of plant blotters, having wood covers, firmly pressed with weights, set screws, or buttons. Remove the specimens to dry papers in two days, and it is advisable to change them again before putting away permanent.

Ferns may be readily colored in various ways. The best method is to paint them with pale-green paint, mixed with refined linseed oil. The ordinary "tube" paint used by artists, is of good quality, and answers the purpose well. The sprays should be painted lighter than in nature, as they grow dark in drying. Turpentine may be used to thin the paint, but it gives the ferns a dark and unnatural color. In coloring, place the ferns on a pane of glass, and apply the paint on both sides, with a soft brush. They will require several days to dry, but when once done, they are made more substantial, and have a natural appearance.

Ferns may be arranged in many ways. The illustration, page 184, shows a pretty design of a fern bracket, which is made as follows: Cut out a thin wood pattern for a back. Fit the back of the fungus evenly to the board by sawing. Nail it firmly in position from the back of the board, and sand it with composition and smalts, and crushed mica rock. Glue a variety of pretty mosses at the junction of the board and fungus. In these, fasten the ferns by sharpening the butt-ends, dipping them in hot glue, and running them into the moss firmly. The back ferns should be the largest, and all should gradually decrease in size in finishing up the front, and a few short grasses may be added.

Ferns may be tastefully arranged in brackets of straw and splints, or simply glued on a pasteboard frame, with moss, grasses, or autumn leaves. They are often used in decorating picture-frames, mantels, alcoves, and doorways.

When used in this way, small brads or wire nails are driven, and a net-work of string made, on which to tie the ferns.

Small ferns arranged naturally in rock-work, with birds and animals, are preferable to the common artificial leaves and half-bleached and colored grasses that are so often used.



CHAPTER III.

AUTUMN LEAVES.

The close of the season of growth is marked by the red, crimson, scarlet, and yellow, of the forest-wood trees,



COMPOUND LEAF OF HICKORY.

and the sides of the hills and mountains assume their bright fall dress throughout the Northern States; particularly in the Connecticut Valley, the foliage at this season presents the richest shades of color. The yellow Chestnut and Birch, the crimson Oak and Sumach, the red and yellow Maple, the variegated species of Dog-

wood, are all blended, and when interspersed with the green Hemlocks make picturesque scenes of vivid color never found in Southern and Western States.

Leaves should be collected early, before the fall rains blight them. The most perfect ones are found on the ends of the limbs, though many good specimens fall to the ground. For color and outline, the Rock and White Maple furnishes the prettiest leaves. The Chestnut, Birch, Willow, Sassafras, Swamp Maple, Hickory, Cherry, and Glossy Cat-brier have yellow leaves of different shades, some Oaks, Alder, Sumach, Maple, Pear, Apple, Blackberry and Virginia Creeper, possess leaves of red hues.

The Three-leaved Ivy, known by various names, takes on most beautiful colors, but many who are tempted to collect its leaves often find themselves badly poisoned. Some may handle them with impunity, but others are poisoned by a slight touch, particularly in hot weather. The Poison Sumach, also called Poison Elder and Dogwood, is to be feared more than the Ivy. With some persons its poison lasts a long while, and is liable to break out whenever friction occurs. The Poison Sumach or Poison Elder is a stout shrub or small tree. It has whitish or bluish berries, a milky juice, and grows in swampy places.

The greater the variety of sizes, shapes, and colors in collecting leaves, the more tasteful and artistic will the designs be. In preparing leaves, press them in books the same as ferns, having several thicknesses of paper between each layer. Change them to dry books a few days after they are pressed, and retain until dry.

When making up ornaments, prepare the leaves as follows: Melt white wax in a shallow tin, and add a very little gamboge. Heat the wax, and dip the leaves, raising them carefully from the bath. The wax should be kept at the proper temperature, which can only be ascertained by trial. If it is too cold, it will set in lumps; if

too warm, the leaves will crimp and curl. When leaves are carefully pressed, they are liable to curl slightly out of shape if exposed to the dry air of heated rooms. The coating of wax prevents this, and preserves the leaves.

Should one wish to lighten the color, dry colors can be rubbed in, and in making fancy designs, a rich com-



BRACKET WITH AUTUMN LEAVES.

bination of shades can be made. The stiff, glossy Holly leaves appear pretty when artificially colored, and make showy "Christmas greens." Sprays of Sumach, Maple, and other small leaves, may be prepared without separating, and they can be tastefully arranged with ferns and grasses.

An almost endless variety of household decorations may be made from autumn leaves, such as brackets, wreaths, shields, etc. The bracket in the illustration on page 189 is made from leaves of the Balloon-tree (*Koelreuteria*) and the fungus from an Oak. The back is of thin wood, nailed to the fungus, and the mosses and leaves are added and glued in position. The Balloon-tree is rare, and if its leaves are not obtainable, those of Sumach may be used.

All flat work is generally made by sewing or gluing leaves on forms of pasteboard, or gluing on thin wood. When one is afraid of defacing walls, designs of ferns, leaves, etc., can be sewed on white tarlatan. The edges can then be cut away, and the design fastened to the wall by one or two small tacks being driven through the tarlatan.

For festooning, leaves should be tied on colored cords, and graduated in size in accordance to the space they are to occupy. For such decoration, long leaves, with abrupt angles in their outlines, are the most graceful, such as those from Oak and Sassafras trees. In making letters, stars, diamonds, etc., leaves are shingled with narrow or deep laps, to cover the required surface. An ingenious person can originate patterns, and find easy and quick ways of covering them.



CHAPTER IV.

GRASSES.

For some years past, ladies have developed a wonderful fondness for ornamental grasses, and many imported varieties, together with native Sea Oats, the beautiful South American Pampas plumes, etc., have found their way into American parlors. Bouquets of grasses in colors have been very largely manufactured in France and Germany, for the American market. The fancy prices they commanded, naturally stimulated Americans to import the seed, and to raise in this country, the foreign grasses which were once brought from beyond the sea by our florists and milliners. These domestic growers and collectors at first experienced some difficulty in bleaching and coloring. They now turn out grasses which are equal in delicacy of tint, and superior in tasteful arrangement to those of foreign competitors. I have, for several years, collected, bleached, and dyed grasses, and the following directions from personal practice will be found valuable.

Grasses should be collected as soon as they become wiry and stiff. If gathered when green, they can be made much whiter, particularly if sun-bleached. Many pretty grasses abound in the marshes and near the sea-shore. The heavy Reed-grass of the salt meadows, and the Feather-grass on the sandy sea-shore, are among the most popular species. When gathered, they should be tied in small bunches and dried, then bleached as follows: First, dip them in strong, boiling soda-water, shake as dry as possible, and lay on racks in a tight-wood box. Burn a little sulphur under them, dry under a hot sun, and repeat the operation until they become white. Straw, wheat, and oats, are bleached in this manner, for the manufacture of florist's baskets. The process will bleach nearly all grasses, but some species require to be placed in a warm bath of

oxalic acid and water, instead of the soda-bath, in finishing them up. Immortelles and other flowers are bleached in the same manner, except a bath of strong castile soap-suds is employed, instead of soda or acid.

In bleaching green grasses, the soda-bath should be used until they are nearly white, for if they are placed in oxalic acid water before the greenness disappears, they will turn red quickly when exposed to the sun. To remove the reddish or brown tinge, add Water of Ammonia to the soda-bath. Chloride of lime is used successfully for bleaching, but on account of its disagreeable odor it is objectionable.

Grasses may be colored by the method used in dyeing fabrics, but the recent aniline dyes are so much more convenient and give so much more delicate and brilliant colors, that they should be used in preference to all others. They are put up for domestic dyeing, and may be purchased in convenient quantities.

All grasses should be thoroughly bleached before coloring. The delicate aniline dyes will not take in soft tints in half-bleached materials, particularly, rose, scarlet, orange, and yellow. Grasses should be thoroughly softened in weak soda-water, before being placed in the coloring vats. Some colors, such as rose, scarlet, magenta, yellow, and purple, take in a few minutes ; others, such as black, brown, green, and blue, require much boiling before the color will set. Grasses dyed in rose, scarlet, and yellow, should be immediately removed from the bath when they are sufficiently colored, for if allowed to remain in the dye long, they become dark-colored and unclean in appearance. Rose, yellow, and orange, are in powder form, and quickly distribute in the water. The dark-red colors are in small green crystals, purple is a tar-like gum, and brown is a heavy powder which requires constant boiling to be thoroughly dissolved.

In coloring Bismarck-brown and dark-green, grasses

or straw-work will require boiling for several hours, and if permitted to cool in the dye, the color will be even and solid. Pieric acid is in crystals, which, when dissolved in water, will impart a pure yellow without the aid of



BASKET BRACKET OF GRASSES.

other dyes. Dark, blackish-brown, or walnut, is made by mixing a little purple dye with Bismarck-brown.

Blue is the most obstinate of colors and does not take without the aid of oil of vitriol (sulphuric acid). To dye blue, soak the grasses in cold vitriol water, and add a very little of the acid to the vat with the dye. Care should be taken in using the vitriol, for, if too strong,

it will eat and destroy the grasses. In all kinds of dyeing, soft water must be used, and rain-water is preferable.

Grasses are made up in bouquets, handle and hanging-baskets, brackets, and vases. In arranging them, too much color should not be used. A few sprays of the most delicate colors among a quantity of bleached material, is in good taste. Rose, scarlet, pale-green, and yellow, make up the best in combination with bleached grasses.

The bracket on page 193 is made by taking half of an ordinary flower-basket of desirable pattern, and sewing it on a pasteboard back, or it can be made more substantially by wiring to a wood back. The basket is filled with sphagnum or peat-moss tied firmly in place. This holds the grasses, which are glued and dry stiffly in position. Ferns and autumn leaves may be used among the grasses, as taste suggests.

Bouquets are made by tying up small bunches of assorted grasses, which are bound in position on a stick, forming one large bouquet. There are no regular rules for arranging grasses, but it is well to put color somewhat in masses, else at a distance, there will be no positive effect. In trimming baskets, the small-headed Italian wheat and oats are used with foreign quaking grasses. They are moistened to prevent breaking, and fastened with covered colored wires in tufts and small bunches. For natural flowers, bleached material only is used.

Small, bushy grasses, bleached and unbleached, will be found useful in ornamental cases of stuffed specimens. Rushes, cat-tails, and the more robust grasses may be painted as described in the "Chapter on Ferns." They may be used for topping large vases and brackets, and tastefully arranged in corners of rooms.

CHAPTER V.

FEATHER WORK.

Loose feathers, of every shape and color, can be utilized in fancy work. Pretty patterns for toilet mats, rugs, sofa-cushions, and a variety of trimmings are easily made, and beautiful lambrequins and brackets are novel in comparison with designs of common worsted-work. Feathers from tropical birds are most valuable, on account of their bright colors. Nearly all South American, Australian, and East Indian birds, have gaudy feathers, with graceful outlines for ornamental work. In Florida and the Gulf States, parrakeets, roseate spoon-bills, ibises, herons, and small birds abound, their plumages being brightest in May.

In the Northern States, some of the smaller birds have bright colors, such as the scarlet tanager, cardinal grosbeak, orioles, woodpeckers, blue-jay, and



FEATHERS FOR TRIMMING.

many warblers. The gulls have pretty feathers, of snowy white and pale-blue, and the birds of prey have richly

colored feathers, mottled in brown, white, gray, black, and dun. Even the common crow has feathers of jet black, which are very beautiful when arranged in direct contrast to white.

Toilet mats may be made by covering pasteboard forms plainly with bright colored silk or velveteen, and trimmed and covered by shingling inwards from the edge with pretty feathers of various outlines. For trimming large mats, lanceolate feathers are generally employed, though feathers with rounded ends may be arranged effectively.



FEATHER FOR TRIMMING SOFA CUSHIONS.

When the last row of feathers has been sewn on, their bases should be concealed by covering with a narrow-pleated ribbon or piece of large chenille, the color of the silk.

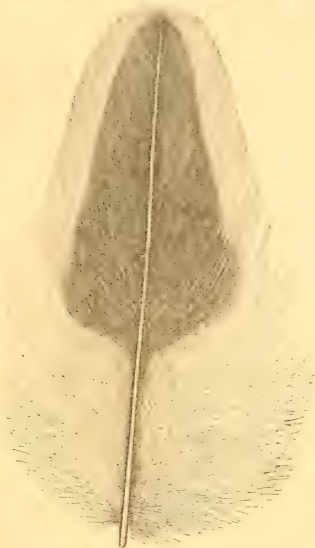
In making ornamental rugs, use a foundation of heavy canvas. Cover the center with velveteen or broadcloth, and trim the outer edges with scalloped bordering of the same. Short, fluffy feathers work to the best advantage, and should be sewn on singly and in rows, closely shingled from the bordering. The first row of feathers should be extended nearly to the edge of the bordering. In completing the last row, reverse them and sew in position, so the quills will be concealed under other feathers.

Sofa cushions may be made to match rugs, and trimmed with borders of short feathers. The centers of rugs and cushions may be neatly embroidered.

Lambrequins may be prettily trimmed with feathers of medium size. They may be selected from fowls, pheasants, sea-birds, and birds of prey, as the smaller birds' feathers are not large enough for this kind of trimming.

A variety of brackets may be made from the wings,

tails, and heads of birds, and from loose feathers. Forms of pasteboard and thin wood are substantial foundations, and originality in designing may be practised to almost any extent. The feathers of nearly every bird make up differently, furnishing new outlines for patterns and or-



SUITABLE FEATHER FOR TRIMMING
LAMBREQUINS.



PROPER SHAPED FEATHER FOR
MAKING MATS.

naments, with pretty combination of color. Feathers will stand much wear if substantially fastened, particularly those from sea-birds, and none are so fragile as might be supposed.

CHAPTER VI.

FANS AND FIRE-SCREENS.

These are among the many useful and ornamental articles that can be made from bird-skins. They are formed by fastening the back edges of two wings together, the butts terminating in an ornamented handle. Wings with short primaries or first quills are used for fans, as they make up in the most convenient shape. Wings with long primaries, such as those of gulls, pigeons, hawks, owls, herons, etc., make the best fire-screens.

In preparing the wings, they should be cut off close to the body, and partially skinned, as in preparing a skin for mounting. A strong, pointed wire is run up the under side of each wing, between the skin and bones, and twisted firmly in position. The bone of the wing is bound tightly to the wire, and wound with jute. Both wings are then pinned in position on a board, with backs to touch; the longest feathers will have to be pinned separately in position, and the whole plumage wound down closely with fine thread, or pinned down with cards or stiff paper. When well dried and stiffened, the wires are fastened in a handle, and the back of the wings drawn tightly together by a strong thread, which is drawn through them with a needle, and tied. The joint between the wings is covered on the front side by a head, mounted medallion-like, and the back may be covered by the spread-tail of a bird. Rosettes of feathers and pieces of bird-skins are also often used. Whole mounted birds, with spread wings, in a flat position, make attractive ornaments. Any fancy additions can be fastened securely with small wire, or by sewing.

Birds with pretty outlines and rich colors can be wired

as in Mounting Birds with Spread Wings, and fastened against the wall, bracket-like, with wings raised straight up, and nearly meeting at the backs. The head may front, being pressed back closely to the wings.



CHAPTER VII.

ORNAMENTAL CROSSES.

The body of a cross is made with two pieces of wood of equal diameter, cutting each piece half way through at the joint, so that the front and back surfaces will be even. Nail the wood firmly together, and fasten to a wood base. Cover the whole with wet plaster, and model as taste may suggest. If a white cross, coat with thin plaster, and dust with burnt alum and frosting.

For imitating stone, cover with the "composition" for sanding rocks, and dress with crushed rock or colored sands. Plaster molds may be made from any cross before it is dressed, and solid crosses cast from one mold. The plaster in a solid cross will set hard in five minutes. If a little dry vermilion color is mixed with the plaster, it will produce a rich cream color when set. Vermilion is one of the few colors that do not prevent plaster from setting. Crosses may be decorated with moss, natural autumn leaves, or artificial leaves, ivy, and flowers.



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